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THROUGH THE YELLOWSTONE PARK.

VACATION NOTES.

SUMMER OF 1888.

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J. E. WILLIAMS, EDITOR AND PROPRIETOR.

AMHERST, MASSACHUSETTS.



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SYNOPSIS.

Ye whose minds are in condition,
Who are tired of work and thinking,
Who believe that in all classes
There are some who would enjoy it,—
That in even country people
There are hopes, desires, and wishes,
For the lands beyond their ken,—
That all the same these country people
Following in the path of others,
Reach at last the goal of others,
And are brightened up and freshened,
Read then this, our simple story,—
This the tale of our vacation.

You shall hear first, how the Raymond was composed:—
Strange, we had a Cook for leader;
Where he went, we all did follow.
How our noble lecturer Strong,
Took the notes of all our rambles;
He the kindest of all others
Followed us in dangerous places
Lest we stumble by the way-side;
Saved our lives repeatedly.
How the "Brownie" sought to tell us
Of the glorious things *he'd* seen,
When we'd seen the same as he had,
Only he—wore colored glasses
That magnified his vision too.

How the Dodges told us stories,
That the ride might be more pleasant.
Senior Dodge of his adventures,
Junior Dodge of fact and fiction,
Kept us posted by the way-side,
Jogged our memories as we rode;
Grateful are we still unto them—
Happy were we Raymond party,
Having such a Batcheller;
Having such a jolly Harris;
From the sky the sun shown on us,
Beamed upon us through the branches,
And the dust poured down upon us,
Still the time did pass most gayly.

And we met these pleasant people—

McLeans and Cadys, Ward and Skinner,
Flavels, Cunningham and Thompson—
Strange to say we had some Collins
Very pleasant were the Coffins too.
A Bartlett pair had we for dessert,
And we all were served alike.
Sargent also, I remember;
And as we journeyed homeward
Ayres we took unto us,
It was a great addition too.
Pleasant recollections, have we of them,
And the happy days that followed.

Thus it was we journeyed westward,
Passed the mountains and the prairies,
Passed the lands of Crows and Sioux,
Passed the dwellings of the Indians;
Came into the region of the "Bad Lands,"
Then unto the Rocky Mountains
Where upon their mighty summits
Saw the colors of the rainbow—
Pleasant was the landscape round us,
Pleasant was the vault above us,
For all the while our feet were nearing
The far off goal—was now before us.
Soon we reached the Mammoth Hot Springs,
Where we rested for a while,
Then the next day journeyed onward,
And the sun shone down upon us
And the dust was like to smother
But our hearts were light and gay,
And we heeded not the small things
That befel us by the way.

And when we came to Upper Geyser
There we rested for a day.
Seated on the porch at noon time
(We had but to turn our eyes to view them)
We could see Old Faithful spouting,
See the Bee-Hive, Castle, Splendid,
Grotto, Oblong, Lioness and Cub,
See them all in action could we,
From the hotel steps at even;
Hear them spouting in the night-time,
Sounding like the roar of thunder
To our unaccustomed ears.

Here our stay was nearly ended
 And we journeyed toward the falls,
 But we tarried at the noon tide
 When we reached Sir Larry's bower.
 And we had such sport about it
 That we near expired from laughing;
 But Sir Larry gave us good things,
 Things we liked to eat you know.
 In his tent did Larry serve us,
 Miles and miles away from houses,
 Served us with substantial good things;
 His resources never failed him,
 And we all were fed alike;
 Cheered us with his Irish humor,
 Cheered us with his Zithern music;
 Made us think of "Home Sweet Home;"
 And our hearts shall cherish Larry
 For the pleasant time we had there.

And again we journeyed onward
 Toward the falls of wondrous beauty;
 Toward the cliffs all unsurpassed,
 And it was at dusk we reached them,
 There we rested over night.
 Refreshed again we started;

Started for a ride on horse-back;
 On a trail that was uneven,
 Hard to climb and hard to cling;
 But the ponies bore us onward,
 Through the brush and fallen timber.
 When our eyes beheld the glories
 We had travelled far to see,
 We were filled with awe and wonder;
 And we held our breath to worship
 God the maker, all things else are his,
 And the eagle's nest far on the cliffs
 Was guarded then and cared for,
 As were we so far from home.
 And we turned our ponies homeward,
 Satisfied beyond expression
 For the glories we had seen.
 And we reached at last the tavern,
 Rested over night then started
 For returning through the mountains.
 Had a long and pleasant journey,
 Glad enough to reach the Hot Springs.
 Then we turned our faces eastward,
 Travelling day and night to get here,
 And we landed safe and soundly,
 Well repaid for all our trouble;
 Safe at last, at "Home, Sweet Home."

VACATION NOTES.

NO. I.

FROM AMHERST TO WYOMING AND THE
YELLOWSTONE NATIONAL PARK.

[From the Amherst (Mass.) Record, Sept. 26,
1888.]

There are many things in life that cannot be demonstrated as actual facts but are assumed as such in the common current of events. The journalist quickly learns that this is one of the first principles of his calling. He practices it every day, and when in good faith he believes that his triple nature needs a period of rest, cessation from the daily routine of office work, he assumes that the cares and perplexities of months and years have earned him a vacation, and he therefore takes one.

Circumstances always combine to create the necessity, and the opportunity is just as certain to follow if one will only wait for the convenient season to come. Sometimes it tarries long but the delay only makes more enjoyable the respite when the welcomed day arrives. Certain things, however, determine the proper time for a vacation, common as this is among all classes of laborers, and growing more popular, more frequent, more necessary, and better understood every year. The amount of business at the office or store, as well as "cash on hand," the season of the year, and, above all, the bank account, are among the *conditions* first to be considered. In this age of inventions and wonderful discoveries nobody thinks of journeying thousands of

miles by rail without a pocketful,—yes, several pocketsful—of nickles and dimes, besides quarters and halves and as much *rags* and hard money as possible, to dispense along the route. These are the necessary things,—more necessary than food to the traveler, and as indispensable as raiment. Title and station are comparatively nothing. Shekels are everything among strangers and in a strange country. Prominence in town affairs and church and political circles at home, will not gain one prominence abroad, unless he be a governor, a congressman, or a president, or, perhaps, the champion prize-fighter. In this land of the free and home of the protectionist, the class of common people is so large that only a few,—the very *uncommon* ones,—are singled out by strangers as being different from the millions that represent the five races, and every condition and industry found in civilized countries. While speeding at the rate of 40 or 50 miles an hour, one may become absorbed in the study of humanity as he observes it around him, especially if he takes a seat in the smoker or among emigrants in one of the forward coaches on an Atlantic & Pacific express between Boston and Chicago, or farther west. One, I say, can make others a study and yet not attract attention himself. But in his own party, most all of whom are strangers at the beginning of the journey, one is no different from the rest, unless he be the champion joker, in which case possibly more attention is paid to his remarks.

Now it so happened that the conditions here mentioned were fairly favorable, or at least they were assumed to be, and it was the good fortune of the writer to lay aside his quill for a month's outing. But while the pen was left in the rack in the office, a generous note-book and pencil were not overlooked in the memorandum of articles indispensable for the journey. That book and pencil have served their purpose well.

It was on Tuesday, the 21st day of August last, that we boarded the train at the Central depot for Northampton and Greenfield. From the last mentioned place the trip was westward, toward the setting sun. But we scarcely saw the sun on that day. The weather was not of the ideal kind. The sky was clouded through the day and the night was horrid, —cold, dark and rainy. At Greenfield we wait several hours for the fast express from Boston. It was due at 10.24 P. M., but was late. We take a Wagner sleeper. Plenty of unoccupied room. But the sections are limited as to space, and even an empty sleeper is not quite like a sizeable sleeping room in Amherst. The unoccupied space is not always divided according to the number of passengers in the car but each berth is limited which is ample, if one only thinks so. But a month on sleepers, and in hotel berths that are no larger than a Wagner or Pullman berth, will accustom one to very limited space.

On Wednesday morning it is still cold and rainy. "Twenty minutes for breakfast." We are at Syracuse, N. Y., the city of salt and brine. It is 7 o'clock and 148 miles from Buffalo. Breakfast over, we speed on our way and first stop at Jordan at 8:10, then at Weedsport, then at Port Byron, at Montazuma, Savannah, Clyde, Lyons, Newark, Fairport, at Rochester at 10:15, and at Buffalo at 12.30. Having sounded the wheels and taken lunch, the train draws out of the large depot and is on its way to Suspension Bridge. Between 2 and 3 o'clock we

reach Niagara, the town celebrated for its mineral springs and huge elms, as well as scores of hotels and boarding-houses, and enough land sharks to devour all that come. At Suspension Bridge we make a prolonged stop, switch the train several times, exchange engines, add several coaches and sleepers, making up a formidable train to which is attached two large locomotives. On seeing the array of Saratogas at this fashionable resort we do not wonder that the baggage men indulge in language more expressive than elegant.

We soon come to the famous bridge and step out upon the car platform to look down upon the green water of the Niagara river 245 feet below us, and catch a glimpse of the Falls a short distance up the river. A scene of beauty and grandeur meets our eye. It is the far-famed Niagara river, which we cross between the cataract and the terrible whirlpool rapids through which so many have foolishly attempted to swim and lost their lives.

The structure is called Roebling's railway bridge, and is considered one of the finest in the world. Its span is 821 feet and has a deflection of 59 feet. There are 14,560 wires or cables in this bridge and they are estimated to bear up 12,000 tons. The bridge crossed and we rush forward across Southern Ontario, Canada, at lightning speed, making few stops till we arrive at Sarnia, on the east side of the river St. Clair, at the southern extremity of Lake Huron. We cross the St. Clair between 10 and 11 o'clock on the ferry-boat to Port Huron on the west bank. The absence of the car's motion, or something else breaks our slumber and on raising the curtain and the window, we welcome the harvest moon shining down upon the turbulent waters in her midnight serenity. The night is calm and the air clear and cold. We make a short stop and then push on through Michigan, and northern part of Indiana to Illinois. At 6 o'clock Thursday morning we find ourselves at Valpa-

riso, Ind., and at 9.30 reach the wickedest city of the Northwest, Chicago. We remain in the city a few hours after being transferred to the Union depot, on Canal street, and then take a train for Milwaukee. The distance is 85 miles, the running time is three hours. The Chicago Milwaukee & St. Paul railway is one of the finest in the Union. Its rolling stock is complete, its service excellent. It runs vestibuled trains at night and parlor cars by day. The trains are well patronized and often crowded. At 2.30, Thursday afternoon we arrive at Milwaukee, "The Cream City," so-called on account of the cream-colored brick, of which many of the most costly buildings are constructed. Here we take a carriage for a drive over the city, and proceed on our journey at 9 o'clock in the evening to St. Paul, arriving there early Friday morning. In St. Paul and Minneapolis we stop till Tuesday eve of the following week and visit the resorts in this vicinity. Here we join the Raymond excursion that left Boston, August 20th. These are the members of the party, the gentlemanly Mr. Charles A. Cook, of Chelsea, Mass., having them in charge:

Bartlett, Mr. John S.	Lynn, Mass.
Bartlett, Mrs. John S.	Lynn, Mass.
Batcheller, Mr. W. T.	W. Winsted, Ct.
Brown, Mr. George W.	Philadelphia, Pa.
Brown, Mrs. S. P.	Philadelphia, Pa.
Cady, Mr. George L.	Lowell, Mass.
Cady, Mrs. George L.	Lowell, Mass.
Coffin, Mr. Charles A.	Lynn, Mass.
Coffin, Mrs. Charles A.	Lynn, Mass.
Coffin, Mr. E. R.	Lynn, Mass.
Cunningham, Mrs. J. G.	Kittanning, Pa.
Dodge, Mr. E. P.	Newburyport, Mass.
Dodge, Mr. R. G.	Newburyport, Mass.
Flavell, Mr. Geo. J.	Germantown, Pa.
Flavell, Mrs. Geo. J.,	Germantown, Pa.
Fredc, Miss H. M.	Philadelphia, Pa.
Hall, Miss L. E.	Charlestown, Mass.
Harris, Mr. Geo. B.	W. Winsted, Ct.
Hyde, Mr. W. L.	Salem, Mass.
McLean, Mr. Alpine	Boston, Mass.
McLean, Mrs. A.	Boston, Mass.
Newhall, Mr. Chas. H.	Lynn, Mass.

Sargent, Mr. C.	Boston, Mass.
Skinner, Mr. Jeffrey	W. Winsted, Ct.
Strong, Mr. E. P.	Macon, Ga.
Thompson, Mrs. J. P.	Kittanning, Pa.
Ward, Mr. D. W. C.	New York, N. Y.
Williams, Mr. J. E.	Amherst, Mass.
Williams, Mrs. J. E.	Amherst, Mass.

During our stay in these, the twin cities of the Northwest, we visit White Bear, a fashionable summer resort on the lake by that name; Minnehaha Falls, Lake Harriet, and other lakes and places of resort; also the exposition at Minneapolis, the largest flouring mills in the world, and a drive over the cities gives one a good idea of the amount of capital invested in real estate, and the magnificent improvements that are either finished or in process of construction.

We also visit West St. Paul, and make a study of what is being done in the cause of missions and for temperance in these cities, especially Minneapolis, with its 148 churches and mission organizations for the higher development of the people. At the Chamber of Commerce we learn the probable condition of the corn and wheat crops,—all of which are noted in our journal. Then, too, by indulging in conversation with some of the oldest inhabitants we become interested in the growth of these cities, and the healthful agencies that lead to their marvelous and unparalleled development, the history of the flour manufacture, etc., etc., which certainly have afforded not a little pleasure as well as profitable and instructive information to the writer.

On Tuesday, August 28, the Raymond party leaves St. Paul, on the Northern Pacific railroad for the Yellowstone National Park, a distance of 1090 miles. The route lies in a north westerly direction, through rich corn fields to Brainerd and thence westward, over prolific prairies, through the fertile bonanza wheat fields of Northern Dakota, and the "bad lands" of the same territory, and across the extensive grazing lands bordering on the Yellowstone river in Mon-

tana, till we arrive at Livingston, at the foot of the Belt range of mountains, about midway between the Great lakes and the Pacific Coast. From Livingston to Cinnabar is 51 miles. We reach here at noon on Thursday, the end of our railroad journey to the Park.

At this point we take stages and travel in them 145 miles in the Rocky Mountains, during our stay of over a week in the Park.

NO. II.

FROM LIVINGSTON TO MAMMOTH HOT SPRINGS, YELLOWSTONE NATIONAL PARK.

[From the Amherst Record, Oct. 3 1888.]

My last letter left the Raymond party at Cinnabar, Montana, the terminus of the Yellowstone branch of the Northern Pacific railroad. This branch is fifty-one miles long and leaves the main track at Livingston, concerning which a word will be in order, before we speak of the route to the National Park.

Livingston, 1032 miles from St. Paul and 123 miles from Helena, is only six or seven years old, but has a population of from 1500 to 2000. It is situated at the base of the Belt range on a plain on the left bank of the Yellowstone river which the main line of the railroad crosses for the last time in its westward course. This plain is hemmed in by hills and mountains, and nestling among them is this western city. One scarcely believes that he is at an altitude of nearly 4,500 feet, while the peaks appearing only a short distance away, tower thousands of feet in the blue vault above. It is a mining town principally, although the owners of tracts of land in the outskirts and farther down the Yellowstone valley raise quantities of wheat and oats and vegetables. The houses are low, only a few two stories high and mostly built of wood. These are new and cozy, and some of the yards and windows well supplied with flowers and shade trees, an

indication of the good taste of the people. Aside from the trees set out about the buildings, the country is black and treeless. There are three hotels, the bon ton house being the Albemarle where our party of tourists breakfasted the morning we arrived. The building is of brick, three stories high and furnishes sixty rooms. There are several large dry goods stores here which give evidence of thrift. One of these, I am informed, does a business of from \$150,000 to \$200,000 a year. The streets are regularly laid out and there are many desirable corner lots for sale but none of our party invested their surplus funds in Montana real estate. Many of the streets in the unpopulated district were grown over with weeds and coarse grasses, the citizens cutting cross lots in well beaten trails. The several church buildings with their low towers are less pretentious than the average church in the old Bay state; but who can doubt that the worshippers are just as devout and as zealous in their christian faith as the Puritans who first planted the cross on New England shores? If, for nothing else, these churches stand as evidence of that faith of the people in the same Jehovah which the Puritan worshipped. Judging from some of the suggestive signs on the principal business row, such as "licensed gambling," etc., a live church organization would be an indispensable adjunct to the highest degree of civilization. The only depot in the place was burned the day before our arrival, but while the embers were still hot and smoking, workmen were making preparations for a fine new one to be built of brick and to cost several thousands of dollars.

Livingston has two banks. Edward H. Talcott, formerly of Amherst, Mass. where he still has many friends, is assistant cashier of the National Park bank. He is a bright, active young man with good resources for the responsible position he holds, and is ranked among the prominent business men of this young city. His Amherst friends will be happy to

learn that he is married to a most worthy young Montana lady and with their infant, enjoys life in one of the prettiest cottages in the place. The institution of which he is cashier, appears to be in a flourishing condition as judged by the statement of the officers to the national bank examiner on the 21st of August. The assets then amounted to \$241,530, the deposits to \$169,887, and the capital invested is \$50,000. This does not show a dearth of capital; but suggests that the mountains are rich with precious ores, the soil productive of good grazing, the machine-shops supplied with ingenious mechanics and farmers and ranchmen of the hill-sides and valleys capable of fertilizing their lands with brains. Not far away are productive coal fields and rich gold and silver mines. The carbonate mines of Castle mountains were opened not long ago. The Northern Pacific company's car shops are located here, and also a round house that is the largest between Brainerd, Minn. and Portland, Ore. There are no macadamized roads, no concrete sidewalks leading to the principal street, no aqueduct to supply the town with water, no horse railroad, no electric lights; but in due time, doubtless, these modern improvements will be introduced. Besides two banks, three hotels, and several churches, there are schools, two weekly newspapers, and two Chinese laundries.

Forty to fifty miles northeast of Livingston is the majestic Crazy mountain range which affords excellent hunting grounds for those who love to hunt large game, such as elk, deer, antelope, mountain wolves and lions, black bear, and feathered game. Two or three miles to the south are the snow mountains, some of whose peaks preserve snow all the year round. The Yellowstone river has carved its way through this mountain range, thus opening a gateway to the National Park. The narrow gorge or lower canon seems especially designed for this purpose.

Our train from Livingston takes a south-

erly course, and soon the city disappears from view. We enter the "gate of the mountains" and the locomotive and freight cars ahead of the Pullman wind around the curves and up the lower cañon of the Yellowstone on the west bank of the river, the mountain sides raising their uplifted heads hundreds of feet above us. In a few minutes we emerge into a fertile valley that widens to the extent of several miles on either side of us. This is called Paradise Valley, a most appropriate name as it is a sort of haven or paradise to ranchmen, and no doubt would be to the cow boys who spend their summers on the open ranches and winter in the "bad lands" of Dakota. Paradise Valley extends up the Yellowstone river for over a score of miles, and the plain between the mountains is ten to twelve miles in width. Civilization has pushed its domain into the valleys among these mountains and now and then we come to a cluster of little houses or here and there to a solitary log cabin called a "shack". Near the cabins will be noticed green fields, gardens, patches of vegetables, and potatoes, and fields of wheat and oats. The green fields are strangely in contrast with the gray and somber plain, because they are irrigated, and can be distinguished for miles. Now and then a hayrick and a herd of horses will be seen, but the country is not intended for general farming but for special crops, controlled entirely by the season. It is not a country for the culture of Indian corn and crops that require a long season. Only by irrigation can the land be profitably cultivated. The soil is a rich loam and could be utilized to better advantage in rainy, "worn-out" New England than in the Rocky mountains, if the New England farmers could exchange their stony drift soil for it. We are now several hundred feet higher than Livingston. The altitude is against the farmer, still it is claimed that 40 bushels of wheat to the acre is not an uncommon yield.

The early settlers experienced perils

and hardships, which form an interesting chapter of unwritten history. This was once the Red man's hunting ground, and long after the white man built his rude cabin here, both home and life were defended with the rifle and shot-gun. Many an old mountaineer and many not so very old in years will tell tales that are fairly blood-curdling to a Yankee. One thing is very peculiar to the people here. I have not met with one who has lived in these sections many years or who grew to manhood in any section inhabited by Indians, who has spoken a good word for the much abused race. When asked how they feel toward the "Poor Indian," they simply repeat that old soldier's remark that the only good Indian is a dead Indian. "I have no use for an Indian," said our driver, who grew to manhood among the Sioux and Crows. This sentiment is the prevailing one here.

The mountains present a most peculiar appearance. We are told that it is because they are of volcanic origin and anything that is of such an origin, ought to be peculiar. A grand and interesting spectacle opens before us, different from anything we have experienced on our journey. Some portions of the crested range are covered with trees, others are bare and barren. The soil differs in different places; sometimes it is red, sometimes a dark gray and varies from black to an alkaline whiteness. Long before Columbus discovered America or Colter escaped from Blackfeet and the Bannack Indians to tell his marvelous tales of lakes of burning pitch, of land on fire, of hot springs and geysers, Paradise Valley was a large lake, and this fertile valley is only the lake-bed with the water drawn out through the "Gate." After steaming up the valley for an hour or so we stop on the bank of the river, and are told that the engine has gone out of sight, to take water. During our stop the angler of the party, Brown, with hook and line betakes himself down the steep bank to the river's edge. He only lacks a grasshopper to

catch a large trout. One of the ladies succeeds in capturing a winged insect and the hook is furnished complete for its deadly work. Our friend is *almost* successful, and if he had pulled in the one that came to the surface and fell from grace and one more he would have had two on the string. There are plenty of fish and nothing to prohibit hooking them. But our time was short, too short for Brown, and we were soon speeding on our way. Paradise Valley left behind, another cañon and then another valley and in this valley, Cinnabar. This cañon (canyon) is called Middle cañon. It is here where "Yankee Jim" lives. He is a well known character but whether he hailed from Yankeedom or not, I am not able to ascertain. No doubt his originality gained him the title. Many years ago before Uncle Sam took possession of the Park, this noted character, with the keenness of a Yankee, applied for a land claim, intending to preempt it and thereby come in possession of the mammoth hot springs. About these springs Yankee Jim intended to build a Chinese wall or some other kind of a fence to protect it and prevent the outside world from seeing the natural wonders. He would have preempted the whole range and prevented anyone from gazing on the lofty peaks. An old "shack" on the terrace at Mammoth Hot Springs, where he lived for some time, is a relic of his original intention. But he only succeeded in becoming the owner of the road-way through the cañon outside the Park, and either did or does now charge toll for every person who drives into the Park by private conveyance. He had it all his own way at one time, and is said to have charged \$2.50 a head. But the building of the railroad to Cinnabar, rather damaged his bonanza, and lessened his revenue from this source.

The history of this region is written upon the rocks and mountain sides as well as upon the soil and mounds and hot springs, in fact all this region bears evidence of terrible convulsive periods,

either of glaciers stranded upon the huge boulders far up on the cliffs, or of internal fires that have been burning since the days of Noah, and are continually forcing open new vents on the surface through which to discharge the accumulated power stored up in latent heat.

At our left is Emigrant's lofty peak, with its head looming up 10,629 feet above the sea level and 6000 feet above the valley. Out of the gulches of this mountain have been taken large quantities of gold, and they are still paying tribute to those who delve for the hidden treasure. The peaks on the west of us are not as lofty until we come in sight of the Electric peak far away, 11,125 feet high, and Sepulchre mountain, 9,770 feet not far from Cinnabar, and the Quadrants 10,127 feet, southwest of Mammoth Hot Springs, and Mt. Evarts east of the Springs, 7,600 feet. Snow is visible on the Quadrants and some of the other peaks all the year round.

Before we are hardly aware of the fact, we come into Cinnabar, at the base of Cinnabar mountain. It is not a large city; but there is a depot here, and a saloon, one of the factors of our civilization, found wherever white men congregate. The keeper of the saloon is also general tourist agent, and the redeeming feature about this story is that he married a young lady from Greenfield, Mass. Here is a yard of live natural history specimens, illustrating the wild animals of this region, including a little kiota, which looks something like a wolf, some elk, deer, antelope, and a black cub, three months old, which he wished to sell me for \$25, and owing to its cheapness and playfulness, I enquired about its habits for the purpose of purchasing it for my memorabilia of the trip. The scenery all about here is of a striking and peculiar character. In the valley are no trees to speak of and the sides of the mountains present different colors. Just before reaching Cinnabar, we see the "Devil's Slide," and the singular formation doubtless

suggested this very appropriate name. The peculiar appearance is said to have been caused "by the washing out of a vertical stratum of comparatively soft material, between one of quartzite and another of porphyry, which projecting strata enclose, like walls, the almost perpendicular "slide," 2,000 feet high." None of our party will be apt to forget the "Devil's Slide."

In a few minutes the members of the party are stowed away in spacious coaches, and the crack of the driver's whip sounds like small firearms, as we near the steep hill beyond the depot. Our journey is up the Gardner Valley by Gardner, on the north line of the National Park, about half way between Cinnabar and Mammoth Hot Springs. Here we find a thriving little city with over twenty buildings, all in a row, including stores, hotels, "Mountain trout restaurant," a brewery and saloon, advertising Ph. Best Milwaukee beer. We did not expect to find a flourishing city on top of the Rocky mountains; but we did, and really some of the party were all through expecting,—we had gotten bravely over it; for that wasn't down in the guide book, and we didn't know what to expect in such a region. About two miles more or less, from the Springs, our driver informs us of a "boiling river," and three of our party, including the writer, steps out and down to see a genuine river of hot water, hot enough to boil eggs, cook a pudding, or anything in the culinary line. To us who had never before seen a hot spring, much less a river of boiling water, what a wonderful sight this was! It was wonder,umber ore,—a genuine "eye-opener." We discussed its merits and source of heat, and tested the temperature of the water with our naked hands, burning them in satisfying ourselves that it was really the genuine article. We found there was no deception in the matter, and each was satisfied without any further experimenting that we could boil eggs in it if we had them. Then we began to look for the source of

the river, and down severa' feet, under a big boulder, boiled up the hot, foaming water. The strangest thing to us was the nearness to the Gardner river; for the big rock was only a few feet away and the water in Gardner was almost ice cold. We snatch a specimen o' a once molten mass and hasten to overturn the coach. The driver in a forward coach let out the fact of another curiosity along the way, and two or three of the passengers got out to investigate it. The honest driver also assured them that it was only half a mile cross lots to the Springs and they decided to walk. This was also an "eye opener" on distances to them; for they refuse to accept the driver's estimate of distances after this experience, and are quite willing to keep their seats in the coach.

We arrive at the hotel, are assigned our rooms, and sit down to do ample justice to a good bill of fare, served by "coons," —excuse me, I should say colored waiters who are blacker than coons.

NO. III.

THROUGH THE PARK.

[From the Amherst Record, Oct. 10, 1888.]

The tourist after having metaphorically swallowed half a dozen railroad pamphlets and guides between St Paul and Livingston, and digested as many descriptions of the Yellowstone National Park, ought in his mind to be prepared to gaze in peaceful adoration and conscious contentment on everything that exists on earth, or between earth and heaven, or anything that does not exist in either. He ought also to view everything with utter amazement no matter how commonplace the object may be to him, or however grotesque, he should see it as others have described it. He should have all the adjectives in his vocabulary in the front row, and in printer's parlance, end every sentence with a "screamer," for the benefit of the fair sex in the party. "The pen

is mightier than the sword," and what this instrument hasn't accomplished in the mind of the tourist who has devoured all the literature bestowed upon him, it would be in vain for his imagination to attempt. And yet, he who has never visited this land of natural wonders and beheld with his own eyes the beauty and loveliness of the canoës and felt his pulse quicken amid the grandeur and sublimity of the domes and pillars, the spires and turrets of the majestic mountains, or stood in awe before those boiling caldrons of earth, or in wonder and amazement seen the internal fires of earth send up columns of boiling water into the air, hundreds of feet high, and heard the thunders that make the earth quake beneath his feet,—if one has only read the imperfect descriptions of these sublime spectacles, he is much like the blind man whose friends have read to him out of the book of nature, while he longs for the revelation of nature itself, to see and appreciate the beautiful creation about him, but which he can experience only by receiving sight to his blind eyes. One needs to be in the midst of these mighty works of Infinite power in order to get a realization of what that beauty is which others have attempted in vain to describe and Doré and other artists to put upon canvas. One needs to be here in order to get a genuine realization of fire and brimstone, and sniff the sulphurous air right from sheol or the burning pit, and it is safe to suppose that no tourist ever went out of this Park with quite the same ideas and opinions that he had formed by reading others, descriptions of it. There are some things that must be seen with the natural eye to be appreciated, and nowhere in the wide world is this more strikingly true than in the Yellowstone Park.

To the reader let the foregoing paragraph be an apology for not undertaking any pretentious descriptions of anything in "Wonderland." Abler pens than mine have failed to exhaust in word-pictures and word-paintings the matchless beauty

and sublime displays of the "King of Glory" who only doest wonders, and whose wonders in this particular region are beyond the power of the human mind to define.

This and the following letters will be devoted to the location or geography of the Yellowstone Park, its extent and topography, its roads and hotels, and its principal points of interest, and then to its hot springs and geysers, and the canons and falls of the Yellowstone river.

The Park lies in the three territories of Idaho, Montana and Wyoming. By far the largest portion is in Wyoming, occupying the northwest section, while a narrow strip on the north and west is in the south and eastern part of Montana, and the southwest corner is in the northeast part of Idaho. It has no natural bounds, but those of latitude and longitude as established by the act of Congress in 1872, based on the report of Prof. F. V. Hayden who surveyed the country in 1871, while in the employ of the United States government. The length of the park is sixty-five miles, north and south, and width fifty-five miles, east and west, and has an area of 3,575 square miles. A bill is now in Congress which will, if it becomes a law, add twenty miles to the south, making the park eighty five miles north and south, and fifteen to the east, making it seventy miles east and west, and giving it an area of 5,950 square miles. The object of Congress was to preserve this tract of territory and withdraw it from settlement, occupancy or sale, under the laws of the United States, and dedicate it and set it apart forever as a public park or pleasure ground for the benefit and enjoyment of the people. It was also to provide for the preservation from injury or spoliation of all timber, mineral deposits, natural curiosities or wonders within the park and to retain them in their natural condition, and to provide against the destruction of the fish and game natural to this place. For this reason the laws are very strict, and the

park is under the exclusive control of the Secretary of the Interior. To enforce the rules of the park United States troops of the regular army are stationed at different points. The cavalry soldiers make tours of inspection at intervals and are stationed at various places to look out for hunters and campers who come into the park, while detachments of infantry have barracks in the vicinity of the hotels, located at the various points along the stage route through the park. The superintendent of the park has assigned certain portions of it for tents and camping purposes, and the soldiers say they experience much difficulty in keeping campers within the bounds of their reservations.

The park is composed of a series of elevations and valleys. The valleys are from 6000 to 7500 feet above sea level, and the peaks and cliffs rise nine, ten and even eleven and twelve thousand feet high. The open plains of the valleys are covered with coarse grass, and afford excellent grazing for horses and cattle, although we saw no cattle in the park. Sheets of water are also scattered all through these plains, often giving rise to creeks and rivers. One of the handsomest lakes I saw on my whole trip is found upon the highest elevation, called the Divide. Lake Mary is a mile or so across, and has a pebbly beach, and its water is of a beautiful blueish or greenish tint. It is situated in the heart of a forest where the rivers that flow east to the Atlantic and west to the Pacific have their rise; and its shore is skirted with woods. The valleys and hillsides and heights are many of them covered with scraggy pines, as thick as they can stand, as if huddled together to withstand the tempests. These trees are unlike any seen in Massachusetts. They shoot up to a wonderful height, as straight as an arrow, and look to be all the way of a bigness from the ground to near the top. Their short, stubby and scrawny limbs, projecting nearly to the bottom of the trunks, seem to defy the elements. There are hundreds,

yes, thousands of acres of dead trees. Instead of falling criss-cross before the gales, large forests of dead pines are leveled, with the trees lying one way, usually with their tops pointing up the slope or valley. In other places they are blown down every which way. But large, dead forests still remain, the trees standing erect, being seasoned through, from top to bottom, yet not decayed. There is "dead-wood" enough in these mountains to provide fuel for all the poor families of New England during their natural lives. This is an example of cause and effect. The cause was the Indians. The effect was death to all vegetation by fire. In Aug., 1876 or '77, I think it was, that Joseph and his band of Nez Percé Indians were on the war-path. The Department of the Interior had ordered Gen. Howard and his command to place the tribe on the Lapwai reservation in the north western part of Idaho. The Indians rebelled, and a bloody fight followed, in the valley of the Big Hole river, where they drove Gen. Gibbon and his soldiers into the woods and recaptured their camp and where their ablest leader, "Looking Glass," was killed. After this attack Gen. Howard pursued them through the park country, being all of one day's march behind them. Joseph and his band of braves marched through the park, burning the country over, destroying all the grass and every green thing on the plains and in the mountains, to prevent the government troops from foraging their horses while enroute. They crossed the Yellowstone river in the vicinity of Grand Canoñ, above the upper falls, and pursued their way across the continental divide, pitching their tents on the Camas prairie in Idaho, west of the park. It will be remembered that Gen. Miles with nine companies of mounted men, one and a half of infantry and a company of Indian scouts, went from Fort Keough, Mont., to Gen. Howard's assistance, but before he met Howard he came upon the Nez Percés on their retreat, in October of that year, and after a four days' fight on Bear Paw

mountain, captured Joseph and his band with a thousand or more ponies. The big chief and his Indians yielded themselves up on the promises of Gen. Miles to restore their ponies and to allow them to return to Idaho, neither of which promise was fulfilled. The trees died from the effects of the fire and now the wood is dry as tinder but still sound and hard.

For miles and hours we ride through a scenic country once heavily wooded but now devastated by fire and wind that have swept up the valleys and across the plains laying low large stretches of pine forests, the ground being buried with its own growth. Where the dead trees are blown down and the land covered with a thick growth of underbrush, the country is impossible for man or horses, or, at least, for a "tenderfoot". In these open lands a few old dead monarchs of the mountain plains still stand erect, like grim sentinels to tell the story of the hardships of many a blizzard and winter's blast.

Now, the park is the people's, and so are the mountains, the forests, the grass, the rocks, the streams, the ponds and lakes, the hot springs, the pools and geysers,—everything,—wonders that Barnum cannot duplicate, nor carry away and publicly exhibit. And so are the roads the people's. While these could be greatly improved, still I suspect that the present highways are a luxurious improvement over those old corduroy roads built when the park was first opened to the public, many miles of which have recently been abandoned. The present roads are far better and the grades far easier than formerly. But what is needed, is a million a year for several years expended for permanent improvements in the park, including a hundred miles of new road. The "dear people," of course, are willing—if their masters in Congress are, and these, no doubt, would be if they should make a tour through Wonderland in Concord coaches. A few millions expended here for the benefit of all Christendom, where all of the people of the United

States can come and forever enjoy it, is far better than hoarding the supposed surplus in sealed vaults in Washington to constitute a bone of contention among rankling statesmen, and be a constant source of annoyance in politics. Would it not be a good scheme, as the boys say, for Congress to join a Raymond excursion, visit the National Park, establish its bounds, and on their return at once, before free trade ruins(?) the country and its income, vote to expend a million on roads and public improvements? Such a juntket would cost the rich Uncle quite a bill but it might be the means of securing what is greatly needed for the development of what nature has lavishly provided for the enjoyment of the people. It would be more sensible than much of the expensive display at banquets and funerals and public gatherings in Washington, and cost less. But within a few years, various smaller sums have been appropriated, and with these new roads have been built. Still a much larger amount could be profitably expended, in new roads to different points in the park that are not now down on the general route given tourists in their coupon-tickets. Some of the old roads were built over steep hills that might be graded down, and in some places the big boulders should be rolled out of the track, where now an experienced Rocky mountain expert driver can scarcely keep his team and passengers right side up, and the men are expected to walk up the mountain to lighten the load on the horses. What new roads there are, are most excellent and a four-horse-coach with its ten or eleven passengers can make six to eight miles an hour, or better if necessary.

NO. IV.

THROUGH THE NATIONAL PARK.

[From the Amherst Record, Oct 17, 1888.]

At the close of my last letter, I was speaking of the roads here in Uncle Sam's

domain. In connection with these it will be well to include two of the minor wonders of the Park. I refer to the "Golden Gate," two miles south of Mammoth Hot Springs hotel, and Obsidian Cliffs, or the mountain of volcanic glass, still farther south. The "Golden Gate" is on the new military road recently built, up Gardner Valley, and cost the government \$14,000 for a mile. The road winds around the narrow defile of the West Gardner River. In one particular place, a shaft of rock stood on the edge of the precipice, and at the suggestion of one of the engineers, it was left standing, and this marks what is called the Golden Gate. The bridge is a remarkable piece of civil engineering, fastened to the side of the cliff on the west bank of the river, suspended 84 feet from the water. Photographs give a view of the structure, showing that it hangs like a huge shelf on the wall of rock. To the right or west of the bridge or Golden Gate, are the Limestone Hoodooes.

At the base of Obsidian mountain, on our left, going south, is the only road of volcanic glass in the world. The cliffs are from 150 to 250 feet high, and extend 1000 feet in length. An immense amount of money was expended here in constructing the road; but the one now in use is a fine one and will last doubtless forever. Large blocks of obsidian have been from time to time detached from the mountain and are broken into small pieces. Col. Norris late superintendent of the Park accomplished the building of the road by building hot fires where he wished to excavate, and when the whole mass was expanded by heat, he dashed cold water over it and suddenly cooled it, and thus fractured the blocks so he could handle them. For quarter of a mile he succeeded in making a glass carriage way. Chips and pebbles of obsidian are found south of here, and the whole region abounds in specimens of this material, in places glittering like gems. It has a glossy luster, is jet black with white flecks, hard enough to scratch com-

mon glass. It is susceptable to high a polish, and was put to various uses by the Indians in making arrow heads, implements of war and tools, relics of which are often found now in the valleys and gulches.

Before dismissing the subject of roads, I wish to add that it is a matter for congratulation that no railroad is yet allowed in the Park. While it may be expected and, perhaps, desirable to see the Northern Pacific's branch extended six or seven miles, near to Mammoth Hot Springs hotel. But when that is accomplished, let it end there, and all roads be forever barred from pushing their way further into this domain. Long may the American people have a tract of country that is not cut up by railroads, telegraph and telephone poles, and given over into the hands of railroad kings to become their stamping ground for steam travel and traffic to swell their plethoric coffers. With the exception of certain improvements, long may the Yellowstone National Park be left as nature has so richly and lavishly endowed it. Men can make good highways, and provide all necessary accommodations for tourists, and let capital be expended on these, and the ambition of capitalists end with these improvements; but never allow the screech of the locomotive to echo among the valleys in the Park. It is said that no Indian would ever build his wigwam near the geysers. He stands in dreadful fear of the terrible forces in the earth. Let the American people fear to desecrate this place, or dedicate it to low and avaricious purposes; but rather let them cherish the beauty and grandeur of these mountains and valleys, and as they come here in the beautiful season of the year to see these natural phenomena, let the breath of the Almighty and the marvelous beauty here wrought teach lessons that shall tend to broaden each one's opinions and deepen his convictions of the Infinite power that governs the universe. Let not the Molly Maguires of commercial greed and avarice

get a foothold and despoil Wonderland, or turn it into a picnic grove for the hoodlums of a whole continent.

The principal stage route is leased of the government, by Mr. George W. Wakefield, of Bozeman, Mont., 18 miles from Livingston, on the N. P. R. R. Mr. Wakefield is an old stager. He came into this region thirty years ago, or when he was about twenty years old, worked as a stage driver, and owned and run stage routes through the mining sections before the railroad was built. He knows what it is to be poor but has amassed a good fortune, is very liberal, pays good wages, and among that large class in these mountains, who follow their occupation as professional drivers, probably no proprietor is more popular or beloved by them than Mr. Wakefield. He is one who understands from experience what the business is and can fully sympathize with the driver whose life is far from a sinecure. His big heart, too, beats for the honest, poor man and his Christianity is of that kind that doeth good unto others. To understand this it is not necessary to become personally acquainted with this gentleman, for the words of drivers, the noble and manly deeds of the man himself in acts of charity and in various ways, which I have learned are numberless,—these bespeak the tenderness and generous nature of the man. And, by the way, however rough the exterior of these drivers may appear, when one understands them he will find that they may possess a vein of true manliness and courage, and when occasion calls for it, will show a tenderness of heart that indicates a higher degree of manhood and charity for others than their coarse manners lead one to expect. Another thing is noticeable among them. Some of them are very well informed and can instruct many of the tourists who place themselves in their hands while traveling through the Park, concerning the history of this part of the country since their boyhood, and before that it

practically had none. They can give graphic accounts of the Indian outbreaks, and they know the spots marked by the death of gallant officers or noted chiefs, battlefields that are reminders of what the U. S. government has done for the "poor Indian," and where it has shown its enlightening and Christianizing influence, blazing from the mouth of cannon and musket, strewing the gorges and valleys with the dead. They know every well-beaten trail on these mountains, and many of them they have followed. Mr. Wakefield owns two hotels in Bozeman, one or more ranches and other property, besides several stage routes. He employs more than 100 men of whom seventy-five are drivers and 25 to 50 stable men and herders. He has the contract for carrying the mail from Livingston to Mammoth Hot Springs, and this being a government station a daily mail is carried through the year. The trains are discontinued on the railroad in the fall, owing to the deep snows and light traffic and then the post carriers make daily trips, the distance being about sixty miles. The number of horses in the park this fall was 180 and Mr. Wakefield owns a large number outside, on his ranches and stage routes. Mr. W. is thoroughly identified with the history of the town where he resides most of the year, and every settler and laborer in this locality has either worked for him or known him by his generous reputation. The government is fortunate in securing so trusty a man, who is also responsible pecuniarily.

The stage horses and many of the saddle horses are of fine patterns; very few of them are cripples and poor in flesh. The stagers are large, strong animals and well cared for in accordance with the customs in these mountains. Mr. Wakefield personally looks after his teams at the Springs and sees that they are well used by his employes. At the Grand Canon and at other places the horses are put up and fed their grain when they come in, and are turned loose on the

plains at night, in charge of a herder who follows that business. At the close of the summer's work the Park horses are examined and the older ones put to work on other stage routes, while herds of the younger ones are turned out to "rustle" for a living on the plains in the vicinity of Livingston. The accounts of the herders whose business it is to look after these herds of horses during the winter are quite interesting. Each animal is branded with the owner's name and turned out in October or November and taken in again in the spring. "Tom" informs me that these horses "winter first rate, and come out fat in the spring, the hair of their winter coats being three and four inches long and so thick that the blizzards have no effect on them." He says when the snow was two and a half and three feet deep on the level, he has seen a score or more of horses standing in a row pawing snow and eating grass with their heads buried to their eyes in snow. This is a common sight, especially after a deep snow, and while it is still soft and moist. This is what they call "rustling,"—a term common among herders and drivers. The horses *rustle* through the day if the temperature is not too low and the wind too severe, and wander about till they find bare spots in sheltered places in the mountain gulches and canons, where they stay at night. I am told that a horse that is housed till after cold weather comes on in the fall, will nearly or quite starve rather than paw snow for a living; so they turn these herds out as early as possible, and not allow them to become attached to the shelter of a barn, but keep them in total ignorance of any easier way to procure food than to rustle for it. They also want them to prepare their winter coats. Observe the contrast between the life of these herds of old stagers and that of hundreds of our New England pets which are allowed the luxury of woolen blankets, close box-stalls, a fire perhaps, and straw beds that would make poor people everywhere happy and comfortable. We

doubt not that good, young horses in Amherst would starve and die if treated as the Montana horses are in the mountains and on the ranches, and possibly the same would be true of the "tender-feet" of the East, if they were to exchange their snug homes for the log-cabins and shacks of this territory. And now a word about the Park vehicles.

While Wyoming can boast of the largest geysers in the world and most beautiful scenery, still, old New England furnishes the equipage to convey tourists through the park to see these natural wonders, and Mr. Wakefield looks to New Hampshire to supply his coaches and harness. The Concord coaches he considers most serviceable and the best he can procure. Eleven passengers can ride quite comfortably on a coach, nine inside and two on the seat with the driver. Even the surreys are provided with strong patent brakes, and a large coach on the steep mountain side is as easily managed with four or six horses, by an expert Rocky mountain driver, as a steam locomotive is with its patent air-brakes, on a dead level. On our return to Mammoth Hot Springs from Grand Canon, we found the Dakota Press association, with 85 strong, registered at the large hotel, and on the following morning saw them packed away in the coaches to begin the tour that we had almost finished. It was no great exertion for Mr. Wakefield's manager to provide locomotive power and capacity for this party of nearly 100, and we learn that at one time this summer a party of 130 came into the Park and were all taken care of, and supplies were not even then exhausted. The saying "There's always room for one more in a stage coach," will apply equally well to the hotels in the Park, and we must not pass these by without a word.

The hotels are all owned and managed by the Yellowstone Park Association, a corporation chartered under the laws of the state of Minnesota. The president of the association is Hon. Charles Gibson, of

St. Louis, Mo., formerly solicitor-general under President Lincoln. R. H. Minty is the association's traveling auditor; W. G. Johnson, comptroller, and E. C. Waters general manager of all the hotels in the park. This association was recently organized, and came into possession of the Upper Geyser Basin hotel only in November, 1887, at sheriff's sale. The hotel at Mammoth Hot Springs, where the Raymond party at present writing is supposed to be, was built in 1883 or 1884, by Rufus Hatch of the Hatch Combination company. This company gave rise to the Yellowstone Park Improvement company, and out of that grew the present association. Whether the association and the Northern Pacific R. R. company are one and the same, I am not well informed but think it may be possible. The building is four stories high, 416 feet long, and accommodates over 200 people, having 104 furnished rooms, and about 50 or 60 more that are not furnished. The best of the season finds the hotel supplied with about an average of 100 guests a day. It requires sixty persons for help at this one hotel, and in all the hotels some 275. The hotel furniture is better than ordinary and the carpets and bedding are of good quality, and everything appears to be in excellent hands. The rooms are large, neatly and nicely furnished and nicely cared for. The halls are carpeted and the servants do their work in a thorough manner, at least this was our impression, judging from the appearance of everything about the hotel. On the first floor is the large dining room, spacious enough for all the guests the hotel accommodates; also a barber's shop, billiard hall and picture gallery. The broad piazza across the front side of the hotel is a grand place to sit or promenade. The property represents \$40,000 to \$50,000.

The hotel is located on a beautiful little plateau, surrounded with fine mountain scenery, many of the high peaks looming up in the distance and plainly visible.

"Terrace mountain," produced by the action of numberless, mammoth hot springs, is only a few rods away, and a short distance from the terrace are the soldiers' barracks and quarters. Near here, also, is the livery barn where are kept the stage horses and vehicles. The pretty cottage between the hotel and the livery, we are told, is occupied by the superintendent of the Park. Near the livery is the post-office, which is of diminutive size, and between the large hotel and the terrace, at the base of the latter, is Cottage hotel, with the cone of an extinct geyser 45 feet high and 20 feet in diameter, standing, as it were, in its front yard. This isolated shaft is one of the most prominent objects about here, and can be seen for miles in some directions. This has been appropriately named "Liberty Cap," and one hundred yards farther west is another cone of less height but of the same character, christened the "Giant's Thumb." These shafts "are composed of overlapping layers of sediment," says Dr. A. C. Peale in his report to Dr. Hayden, on the thermal springs of the Park, in 1881, "having evidently been built up by the overflow of the water from the orifice at the top. The deposit is hard, of close, compact structure, and of considerable age. Surrounding "Liberty Cap" cone are a number of shallow basins, some of which are snowy white tinted with pink."

These relics of old spouters are very old, doubtless hundreds and perhaps thousands of years. They remind us of the curious figures in the "Garden of the Gods," in Colorado, near Manitou. They are of a brown and reddish tint, as if the sediment of the shafts contained iron, which was probably the case, in some of its different combinations or oxides. The same elements of nature that formed them, now that the force below has changed its course, are busy wasting them away, and probably a few generations to come will see them leveled to the ground.

The earth all about here sounds more or less hollow while walking or riding over it as if there were cavities near the surface, and we suspect that this is true, that the earth in this region is full of caverns. Within fifty rods of the large hotel is another extinct geyser. The crater is a small one and nearly on a level with the plain around it, having only a slight elevation. We find here a ladder and down this ladder we descend for 25 to 40 feet, then climb down on a rough incline in the earth till we are fifty or more feet below the surface. Here is an immense chamber, with a kind of a dome or oval ceiling, the exit being on one side. It would require a good many cubic feet of earth to fill this cavity. On one side in the bottom is another opening into the bowels of the earth where darkness reigns supreme. We take a look into this and see nothing but a huge hole, which excites more wonder, as the satirist has it, than a star in the heavens. But we are satisfied to accept the statement that men with ladders and lanterns have been down two hundred feet towards China and on measuring the distance they traveled in a cavern towards the hotel, found that the hotel was nearly in the line of their zenith. To be more explicit in the matter, the reader can think of a right-angle triangle, and suppose the perpendicular two hundred feet representing the depth, and the base 400 to 600, perhaps 1000 feet, representing the distance from the hotel to the entrance of the old geyser. This is certainly an object lesson to one who has been through the Park and witnessed the immense geysers in action, and from it one gets an interior view of those deep caverns that at intervals are still belching forth water and steam, and which for centuries have served as vents or safety-valves for Nature's great storehouse of force. But I am not quite through with the hotels, and to return to my subject. I advise those coming here to take a "mineral bath,"—a hot

bath if the hot water holds out, but at all events take a genuine "mineral" bath. If the tourist comes from the south and has made the "grand tour" in as dry a season as this has been, this advice is needless, for the first thing he thinks of on his arrival at the hotel is to relieve himself of several pounds, more or less, of dust and superfluous grime. I speak from experience. But after a week's bath in pulverized dust as fine as the finest ashes, with raw lips and throat as dry and parched as the gray earth, and clothes saturated with dust, one will not be apt to neglect his ablutionary exercise when opportunity is offered.

It was my good fortune to ride by the side of Thomas Casey, the faithful and intelligent, as well as the most experienced driver in the Park, for over a hundred miles, and for a few miles south of the "Golden Gate," it is no exaggeration of the fact when I say that more than once the pole horses and the driver by my side were invisible for a fraction of an hour, so heavy was the cloud of dust that enveloped the whole team. Much less could we see our "lecturer" ensconced on the middle seat. It reminded me of old pictures of halos surrounding the heads of saints with their glory departed. The reader can imagine the picture better than I can describe it. The dust particles remind me of atoms and molecules in my first lessons in physics and chemistry, only the identity and the effect of the matter are preserved with a vengeance. Judging from the quantity of gray material that gracefully deposited itself on the garments and vesture of the passengers in the rear coach, [our's being the forward one in the procession] each must have swallowed his or her "peck" of mountain dirt. And I might state that the season here has been unusually dry. For three or four weeks previous to our visit, no rain to speak of had fallen in the valleys of the Park, and from the morning after we left Greenfield until our return to Chicago, four weeks, we saw no rain.

The wheat fields of Dakota have actually suffered and so have the corn fields in some sections of Minnesota and other states.

NO. V.

[From the Amherst Record, Oct 24, 1888.]

There are five hotels in the Park besides those at the Springs. In July, 1887, a fine one was burned at Norris Geyser Basin, that would accommodate 300 guests and cost \$35,000. The present one, Frank J. Drew, manager, will accommodate forty people over night, and feed a larger number. It was built in seven days from the time the carpenters began work. Builders would not show greater enterprise in the East. It was burned at mid-day, at an unfortunate season of the year. The present hotel is a long, one story building with a spacious dining-room across the north end. More people are fed here than at either of the hotels below, as this is the half-way point between Mammoth Springs and Grand Canoñ and Mammoth Springs and Lower Basin, and parties arrive here from either or all of these places about noon. There are some hot springs about here and a sulphur spring near by; also in the doorway is a cold mineral spring with medicinal properties. The singular thing about this spring is that it boils up continuously but there seems to be no out-let to it, and the question is asked, over and over again, where does the water go to? We give it up for. Let the expert answer it.

At the Lower Basin, the hotel, Benton Hatch, landlord, will accommodate 115 people. It is a two story building and makes very comfortable quarters for summer. The rough hotels, built for temporary purposes, at some of the watering-places and inland woods in the East are some what like the one at Lower Basin. But in this hotel, the partitions are covered with thin cotton cloth, which serves as a lining. Of course the boards are not matched, not all of them are jointed and there is a profusion of knot-holes with the

knots missing. But to obviate all difficulty or embarrassment that might arise among the country guests, the hotel furnishes a good supply of candles, instead of kerosene or gas, and the scintillation of these candles, seems to answer a double purpose, in fact, all purposes. Now these tapers are excellent for weak eyes and in the *radiance* (rather obscure) of their soft light one can almost see ghosts and will notice attenuated forms and phantoms flitting before him or dancing upon the wall, and soon disappear.

The hotel at Upper Geyser Basin, I. L. Hunt, manager, is two stories high, and accommodates eighty guests. It stands on a level plain, near the upper end of the Firehole valley, the southern limit of the Park tour, and there are hot springs and geysers on every side. The company that owned this property failed three years ago, and last November it fell into the hands of the Yellowstone Park Association, which was formed since the failure. It is equipped for a first-class hotel, and is well managed by its genial landlord. This is the center of curiosities in the Park, and some of them are connected with the hotel. For instance, here is a natural steam laundry, where the hotel guests can have their fine linen done up in good style by the Laundress who presides over a hot spring just west of here. The laundry consists of a tent, two colored women, a baby or two, and a genuine boiling hot spring. The dirty clothes are thrown into a box floating around in the spring; then they are rubbed by hand a little and put back into the spring to boil. They come out as white as the driven snow, and are beautifully starched, and ironed till nearly worn out, so faithful is the laundress. This is one of the attractions of the hotel; another is on the way to the laundry. It is what I should call the Yankee water works. A few yards back of the hotel runs quite a creek of cold water. A Yankee or some other genius has utilized this water privilege to good advantage. There is no hydraulic

or force pump, no windmill, no steam power of any kind; but simply a dam, a water-wheel, an endless belt, a couple of pulleys, etc., and by this simple machinery the water is lifted from the stream to a tank 75 to 100 feet high, and never ceases to flow into the reservoir in the top of the hotel as long as the latter is not full. The water runs over the small dam, at one end of which it falls down upon a little old fashioned overshot water-wheel, and at the other end of the dam it falls into tin cups and fruit cans wired or fastened to a long upright endless belt. The water drives the water wheel and the pulley fastened to the shaft of the water-wheel, drives the long belt; the belt conveys the water in the cups to the top and there as it comes over the upper pulley, it pours into a tank high enough to give it fall and force itself into the reservoir in the top of the hotel. There the water runs night and day, and furnishes power without expense, raising the water and keeping the hotel reservoir full. The principle is the same as used to lift grain in elevators and mills. Also connected with this public house is still another curiosity, this one in the form of a large colored barber. He charges only the regular price for shaving—25 cents,—and the way he shaves when he gets right down to business, is a caution,—to those who know better than to go a second time. One shave will certainly last all the time the tourist spends at this hotel, even if he stays here long enough to grow a full beard. At Grand Canon, the hotel is built on the left bank of the Yellowstone river, only a few rods from the upper falls. Z. E. Bloomburg of Pontiac, Mich., manager, and Mrs. Bloomburg, matron, are very hospitable people. They do not appear too aristocratic to mingle with the guests but are about the hotel as if that was their place, looking after the wants of all. They evidently understand running a public house for the comfort and satisfaction of its patrons. The hotel is a long, one story wooden building, built in 1886 and the

two car loads of lumber that were sent here over the Northern Pacific railroad, we are told, cost \$585 for freight alone from St. Paul, which was considered a pretty big freight bill. The hotel is 225 feet long by 32 feet wide and contains 45 sleeping rooms, which, of course, are all on the ground floor. Two weeks before our visit to Grand Canon, the landlord said, they provided for a party of 132 people over night. There are a number of tents and small cottages near by for the help and over-flow of guests, so that all who come are accommodated. But next season the hotel association expects to put up a fine building to take the place of the present one and all its annexes, that shall accommodate 250 guests. Doubtless a new hotel will be built at Norris Basin in a few years and then the Park will be admirably provided with ample hotel accommodations.

And now it only remains to speak of Larry's hotel at Lunch Creek before dropping the subject of hotels. This is the half-way restaurant between the Upper Basin and Canon, but is under the same management as the other hotels. We leave the Basin at 7 A. M. pass up the valley of the East Fork of the Firehole river, 12 to 14 miles, to the continental divide where the elevation is 8,500 feet, and where is Lake Mary of which I have already spoken. We strike the forest at the foot of the mountain and our way leads through a heavily wooded country until we begin to descend on the eastern slope. Up the mountain are many places where we feast our eyes on gorgeous scenery and survey an extensive tract of territory comprising a large portion of the entire Park, and all the way up and for miles over the highest elevation, on both sides of the road, the trees stand "as thick as spatter." We pass Alum Spring, the source of Alum Creek, and pretty soon begin to descend into Hayden Valley down the eastern slope of the mountain. From Lake Mary to Lunch Creek hotel, it is five miles, from Upper Basin it is

twenty to twenty-five miles, and up a mountain pass, almost perpendicular, where are rocks in the road one, two, and I can't say but three feet in thickness. The ladies who remained in the coach may know for a certainty just how far the wheels dropped in passing over the rocks. The gentlemen and one brave lady walk to the top of the mountain. We are all glad to come once more out into the open country. Soon after we emerge from the woods, our way leads down a steep pitch, and suddenly we come upon a camp on the right hand side of the road where are several tents close together. Here is the parlor and reception room, the dining room, the kitchen and the office, all carpeted with mother earth. These combine to make up Larry's palace camp, the peculiar reputation of which scarcely has its equal in the Park. Over the door to one of the tents is the familiar motto "There's no place like home." In the rear is the kitchen and side of this is the "office." The proprietor, landlord, cook, waiter, and all, is Lawrence Mathews, a kinsman of Father Mathew. He is a genuine son of old Erin, profusely intensified, and betrays his nationality in his walk, manner and sparkling wit. He appears to have the gift of prophecy and much knowledge of human nature and understands many mysteries in providing for the wants of tourists, and bestows all his goods to feed those who come to his side-board. Applying a western term, Larry "is a hustler from way back." With his witty remarks and originality, he keeps everybody in good humor, in fact, he seasons his whole bill of fare with Irish wit. And after riding five or six hours over the Rocky mountain roads, every one has been prepared to relish even a cold dinner served in the original style. We arrive about half-past twelve and are cordially welcomed by mine host, who invites his guests to come into his sumptuous feast, and if the front door is crowded, he raises the side of the tent and asks us in at the "side door." Although the tables

are loaded with viands and every inch of space on the boards is covered with crockery and good things to eat, still Larry assures us he has "four more courses," and sure enough he has, the last course being "tickets." His menu includes cold boiled ham, canned meats on garnished platters, and abundance of "tongue, both corned and human;" and declares his "turkey" were "fresh laid this morning." The eggs were shelled and cold as ice, right out of the trout creek not far away; they were boiled, he said, an hour in soda and lime-water. Larry must have been a connoisseur to have made such nice coffee, although it wasn't improved by adding condensed milk. After dinner, Larry's assistant, a young Swede, entertains the party with his zithern, on which he played several foreign pieces and a few familiar airs. In answer to a question he said he didn't know "America;" but he played "God Save the Queen" with pleasing effect. The sweet strains of "Home, Sweet Home" brought tears to the eyes of some in the party as their cherished memories of home and their friends came over them.

It was Monday the 3d of September, cool and pleasant, but only two weeks previous, (Aug. 20) the ground between the dining-room and office was covered with snow, and it remained for 24 hours, said Larry. All who come here are invited to record their names in the reception room. The register is a planed board, hung on the inside of the tent on which many have registered. The tables, are also used for that purpose, as scores of autographs testify. Larry invited all the party to come next year when, he said, "we probably shall have a larger hotel, as the city is growing."

Now in regard to the service, it is but due to the managers of these Park hotels to state that it is excellent. Landlords are very hospitable and do all they can for the comfort and wants of their guests. The food is abundant in variety and quantity, palatable and nicely cooked, and when one stops to consider the distance everything

is brought, the disadvantage of being 60 miles from the nearest town of any size where there is a market, the tourist is agreeably surprised to find so many things provided for his comfort.

All the hotels in the Park are connected by telephone, and the instruments are in constant use, and their service is invaluable. A very few years will doubtless witness as many marked improvements as a few years past have in hotel accommodations. The pioneer hotels were mere tents, and only a very short time ago were these exchanged for wooden buildings. These in time will give way to larger and more finished and pretentious structures.

And now having located for my readers the National Park, and in a general way spoken of the roads, vehicles, and hotels, it remains to say something of the wonders of Wonderland, and in my next letter, I hope to mention some of them by name, show at what points they are found and then give some idea of their characteristics and what special features designate them as the greatest attractions on the continent and rank them with the wonders of the world.

NO. VI.

[From the Amherst Record, Nov. 14, 1888.]

The chief wonders of the Park are found in groups of which there are several. Our entrance into the Park, as I have already stated, was via Cinnabar and Mammoth Hot Springs. About twenty or twenty-five miles south is Norris Basin, and twenty miles farther south is Firehole or Lower Geyser Basin, and twelve miles beyond Firehole, is the Upper Basin, the southern limit of the Park tour. I say the wonderful springs and geysers are largely in groups; but no one should think that all the wonders are at these central points; for all along the way are scenes and objects that astonish the tourist, who enjoys one constant round of surprises as long as he remains in the reser-

vation. There are beautiful scenes amid hills and vales, deep ravines and canons with pretty streams of water, tinged with richest hues, tumbling over cascades of rock or broken up in a series of low falls. The route from north to south is full of interest to the stranger in Wonderland, and it is located in such a manner that the interest increases in direct ratio with the distance traveled until Grand canon, the grandest attraction of all, is reached.

The tourists arrive at Mammoth Hot Springs soon after noon, remain here over night, and at about 8 o'clock on the following morning begin the grand tour of the Park, which occupies from five to eight days. The Raymond tickets give the holders a week in the Park or about two days longer than the usual coupon-tickets issued by the Northern Pacific railroad company, thus affording them opportunity to make longer visits, see more geysers in action and get a better idea of the reservation than a more hurried tour can give. I will not attempt to express my own thoughts nor the feelings of others while gazing for the first time on boiling, bubbling pools and sniffing the sulphurous air, more suggestive than pleasant. Suffice it to say that each of our party was surprised, I might say astonished, to find such wonders actually in existence. We had read about them and perused our carefully prepared guide books, so fascinating and entertaining. But reading those vivid descriptions, appealing to the imagination and producing pictures in the mind, is one thing, but pleasing as these are, while en route for Yellowstone, still seeing is quite another, and faith in the unseen exchanged for vision gives greater satisfaction than another's description or an artist's conception on canvas. "To see these springs," said more than one, "repays me for a trip here; it is worth all it has cost." So felt all who first saw Terrace Mountain; but, as one of the soldiers remarked, "You won't think much of this

place when you come back from the Grand Canon," so marked and more wonderful are the geysers, the grand canon and great falls.

Now what is there to be seen at these central places I have mentioned? First on the route is Mammoth Hot Springs. These thermal springs are the largest to be found on the American continent and have built up an elevation out of their deposits that is 200 feet high. It is called Terrace Mountain on account of the terraces which present a peculiar appearance, and are as interesting to study as they are striking to the beholder. The plain or plateau is 800 feet above the bed of the Gardiner river, which flows through the valley of the same name, about a mile from the hotel. The chain of comparatively low heights that surround the plateau limit the extent of the views which are quite fine and somewhat picturesque from the piazza, that extends 400 feet across the front of the hotel. This low range of mountains is bare in places; and they appear as if glaciers had given them a hard rub, which is probably true. Then again, quite large tracts are covered with pine forests, and the farthest peaks are tipped with perpetual snow. The latter are seen only at a short distance from here. Mount Evarts, not far to the east, is the highest elevation near here. It is 7,600 feet above sea level and 1,100 feet higher than the plain on which the hotel is located. It received its name for a Mr. Evarts, a member of a party of prospectors from Montana who came here under the lead of Gen. Washburn, the U. S. surveyor general, in 1870. Mr. Evarts became separated from his companions near the head of Yellowstone lake, some forty or fifty miles to the southeast of the Springs, and after enduring severe hardships for one or two days, was found near Mammoth Hot Springs not far from the base of this mountain; hence the name Mount Evarts. The bold summits of the higher mountains are not visible from the hotel. The lowest altitude in the Park plateau,

as the government's reservation is called, is near the mouth of the Gardiner river where it is 5,360 feet. The highest altitude is Electric Peak, northeast of the Springs, 11,125 feet. The name was given to the latter mountain on account of a member of an expedition in July, 1872, being enveloped in an electric cloud which caused a peculiar sensation to the individual and was not very agreeable. The elevation at the hotel at Mammoth Hot Springs is 6,500 feet.

The Hot Springs formation covers an area of about three square miles, and the Springs still active are found on 170 acres. All the terraces have the same general features and were built up in the same, or similar manner. In their appearance however, they are strikingly different, and possess an endless variety of shades and colors, from widely distinct primaries to all the gradations between. These shades are due to chemical changes and different substances in the earth. The terraces are long, broad, natural, circular stairs, formed at right angles. The hot water, highly charged with carbonates and sulphates, boils up and flows over the brim of the upper bowl in gentle rills, down into the next bowl, and then into the next, and so on till it reaches the base and is either conducted to the hotel in pipes for hot baths, or runs away and mingles with the water in the Gardiner river. It also oozes out of the formation at different elevations, and the whole region is saturated with hot water. Those who climb the terraces and walk about over the formation, will be painfully aware of the fact by their shoes becoming hot and wet through. The distance between the terraces is several feet, and one must do some tall climbing before he reaches the top stair or terrace. Every inch of this region has peculiar characteristics. Nothing in Massachusetts or the East resembles the Rocky mountain districts, and no area on the American continent contains so many natural wonders as the Yellowstone Park with countless phe-

nomena accompanying them. The water, as I have already stated, is impregnated with soluble substances that are products of chemical action. Each pool usually has two places of ebullition; if oblong and circular, one is near each end, and the water flows in pulsating waves towards the outer edge of the basin or front of the terrace where by evaporation it deposits its material, forming the corrugated brim in the same manner as ice is formed on the edge of a puddle when it begins to freeze over. The water also contains iron in some of its many forms, or at least traces of iron which give various colors and hues to the substances held in solution such as lime soda, magnesia and sulphur in the presence of different acids. The water is often of the most delicate bluish tint, as transparent as crystal, so the eye can penetrate to enormous depths, and still see no bottom to the pools or springs. But as it flows down the terraces it is changed into different colors that no artist can duplicate and no pen can describe. Pretty stalactites of different sizes extend from terrace to terrace like pendent cones inverted, icicle shaped, presenting as many colors as the rainbow, which are produced by the presence of iron and other matter in the carbonate of lime solution. Then in addition to all this is fretwork as delicate as only Nature can produce. The dainty jewelry made by Mexican maidens so much worn and admired by ladies everywhere, in beauty and delicacy, has no comparison to this hand of nature.

Concerning the extinct spring terraces, the following is a quotation from the Park Guide book:— "The distance from the principal group of active hot springs to the nearest point on Gardiner River is about one mile. A hard scramble over the rough declivities of several intervening extinct spring terraces and through an occasional belt of timber is the penalty of making it. Numerous deep pits, now overgrown with bushes and scrubby pines, show the places which once were pools. Below the pits the scalloped rims of former basins are distinctly seen, and well-rounded geyser cones are

also sometimes noticed. Many of the pines which have grown out of the ancient deposit are large and stately, perhaps 80 or 100 years of age. Their flourishing condition is in strong contrast with that of the trees in the neighborhood of the active springs. The deposit of sinter has doomed to destruction all the forest growth that lies in its course. It has already banked itself around hundreds of trees on the slope of the hill where the hot springs are now at work, covering them to the depth of several feet, and its encroachments steadily continue. Numbers of these blasted, helpless pines still stand erect, looking quite dismal, imbedded in snow-white sinter, which almost touches their leafless branches. Along the river bank there are still many active boiling springs. For a mile up the hill-side there is terrace after terrace of extinct springs. Then comes the principal point of present activity, which extends with gradually waning power over a distance of a mile into the dense woods on the top of the mountain. There are fourteen well-defined terraces within the bounds mentioned, which are now, or have been at one time, the scene of boiling-spring activity. Although the Mammoth Hot Springs are by far the most important of the kind now active in the world, they are insignificant as compared with what they were when they built Terrace Mountain; or to what other springs were, perhaps, at the same period, which resulted in the formation of the immense cliffs along the Yellowstone at Bear Gulch, at Sheep-eater Cliff, and many other localities where these enormous deposits, now destitute of active springs, are slowly crumbling away."

Dr. Geikie thus describes the active springs :

"The first glimpse of this singular scene caught from a crest of the dividing ridge, recalls the termination of a glacier. A mass of snowy whiteness protrudes from a lateral pine valley, and presents a steep front to the narrow plain on its base. The contrast between it and the sombre hue of the pines all round, heightens the resemblance of its form and aspect to a mass of ice. It is all rock, however, deposited by the hot water which, issuing from innumerable openings down the valley, has in course of time filled it up with white sinter. Columns of steam rising from the mass, bear witness even at a distance to the nature of the locality. We wandered over this singular accumulation, each of us searching for a pool of

water cool enough to be used as a bath. I found one where the water, after quitting its conduit, made a circuit round a basin of sinter, and in so doing cooled down sufficiently to let one sit in it. The top of the mound, and, indeed, those parts of the deposits generally, from which the water has retreated, and which was therefore dried and exposed to the weather, are apt to crack into thin shells, or to crumble into white powder. But along the steep front from which most of the springs escape, the water collects into basins and has the most exquisitely fretted rim. It is at their margin that evaporation proceeds most vigorously and deposition takes place most rapidly; hence the rim is being constantly added to. The colors of these wavy, frill-like borders are sometimes remarkably vivid. The contrast between the heat below and the cold above ground at nights, is sometimes very great. We used to rise about daybreak, and, repairing to the nearest brook or river for ablution, sometimes found a crust of ice on its quiet pools."

While viewing these products of Nature, wrought in her great magnificent laboratory, the mysteries of which no scientist has been able to fathom, how vividly are brought to mind some of the scenes in the old laboratory at Amherst, during my college days. Often does a student in chemistry *in his mind* discover a "new element," and when he has gained confidence in his own knowledge of the science, he approaches the genial professor and lays his case before him. Of course, the doctor, to solve the mystery, must witness his pupil's procedure, and the latter's chemistry is very soon put to test and his knowledge is quickly exhausted under the searching eye of the old master. Many are the results obtained in the college laboratory that promised wonderfully well to the student but proved to be faulty and only compounds and mixtures too complex for the young chemist. But never do Nature's laws deviate and every result has its cause, and every cause its effect. In the Yellowstone Park we see numberless effects. They appear on the surface, but the compounds, mixtures and new combinations and substances, manifold as the agencies that

produced them, were forced through subterranean channels and caverns the depth of which human ingenuity cannot measure, nor can human knowledge determine the source and supply of the chemical agents and basic elements. Thus is this variety of substances the result of an infinite number of chemical changes, elements uniting and separating, producing acids and alkalies, vapors and gases, liquids and solids, acting and reacting on each other, *ad infinitum*. The stronger acids drive out the weaker acids and produce heat. The heat produces steam and other vapors and gases, some of which, like sulphureted hydrogen, have a strong pungent odor very noticeable among the hot springs and geysers. Evaporation is constantly taking place, leaving carbonate of lime and silicates behind to crumble and fall into a palpable powder and snow-white sinter. Wherever the springs cease to flow, the deposit becomes dry and crumbling. There is terrace after terrace built up in this manner, where the springs are extinct, covering, as we have stated, three square miles.

Considering the exceedingly slow rate of formation at the present time, one cannot help reflecting upon the countless ages since the waters subsided and left the springs to boil and sputter for other ages till they had finished their work and ceased their boiling, leaving their mounds to be gazed upon in wonderment by succeeding generations. Doubtless the center of activity among the springs has changed from the present scene, and mounds and hills now grown over with trees were once seething caldrons, pouring their calcareous and alkaline waters down their white terraces, preventing all signs of vegetation. The live formation is said to increase from the deposits, at the present time, at the rate of less than one-sixtieth of an inch per day. Those who wish to apply their arithmetic to this problem should first consider that these springs have already raised their height to over two hundred feet. But the diffi-

culty lies in not being able to say that the rate has been uniform all these centuries. That is also the difficulty experienced with geologists in fixing the age of the earth's formation. What might have existed here as far back as Noah's day is mere conjecture and assumption; but it doubtless would have been a much more dangerous haven at that period of the world's history than Western Asia for the ark of that good man and his family.

In his report upon the reconnaissance of Northwestern Wyoming, including Yellowstone National Park, made in the summer of 1873, William A. Jones, captain of the U. S. corps of engineers, in discussing the evidences of age of these terraces, speaks of the pine trees on the upper terraces, some of which are fully thirty inches in diameter that is equivalent to a growth of five hundred years. He further says: "Bearing in mind the great length of time which must have elapsed after the extinction of the springs before vegetation could have covered the terraces, as well as the extreme slowness with which deposits of vegetable mold are accumulated, we are justified in believing that at least, one thousand years have passed since the complete cessation of activity over the upper or oldest terrace. It is, however, more than probable, all things being considered, that this era has extended over many times that period. If now we allow that all the spring deposits of the first twelve terraces, counting from below, have been formed during this latter epoch (which is scarcely possible) we shall certainly not be over-estimating the antiquity of the volcanic outflows in this section, if we regard their age as eight thousand years. To one who has the opportunity of examining this remarkable formation these figures will appear small indeed, and I am myself convinced that a period of more than twenty thousand years has elapsed since the origin of the earliest springs in this section, at the very lowest calculation consistent with all the facts thus far collected."

On one of the terraces is an upright ladder on a round of which is a hook on which light articles are often hung and a coating nearly a sixteenth of an inch thick will form in about four days. This, I believe, is permitted by the rich Uncle,

and articles coated with these carbonate may be carried away by tourists. But strictly according to the rules of the Park no person is allowed to carry away anything in the Park, without special permission. No person is allowed to write his autograph on the formations, under penalty of being escorted out of the reservation with all the military pomp and dignity of the standing army of the United States. Hunters of game are served in the same way only they are relieved of their game, if they secure any, and gunning paraphernalia. If caught in the outskirts of the Park, they are marshaled before a tribunal at Hot Springs and allowed to tell their story and if believed are discharged on payment of a small fine or perhaps let off free, minus their game, etc.

But even the U. S. army is not equal to the task of preventing the writing of autographs on the formations, for they are omnipresent in the Park. It is a very easy matter to write a name on this white substance—that is, if the soldiers are not watching. Once written it never rubs out nor washes out, and is not easily scratched out, but is quickly covered with a transparent, pearly, indelible coating that lasts a life time. A lady of our party, standing near Fountain geyser, seeing a name the same as her own, stooped over to duplicate it when the soldier spoke, saying, "Madam, you are liable to be arrested for doing that." The autograph was abandoned and everybody was shy of soldiers after such a warning.

A Frenchman from Paris, who could see a great deal but could speak very little English, traveled with the Raymond party from St. Paul, and was with us several days in the Park. He had secured permission of the U. S. Government to gather specimens in the Park for the Paris exposition, and with his spacious satchel became very enthusiastic, gathering specimens of everything but hot water and steam and sketching every object he saw. His ingenuity was tested before the English table waiters; but he managed so

well among the tourists that by duplicating the orders of his neighbors, he fared very comfortably.

Scattered over the main terrace are caves with openings, about which is beautiful frost-work. Then there are narrow ridges, extending on the upper terrace which are hollow and you see the steam issuing from crevices and pools along the ridge, hear the gurgling waters and hissing of the steam within. The smell of sulphur is strong at these places, and one treads pretty carefully and looks twice before he steps, in climbing from mound to mound. Dr. Peale has described fifty-two different springs with varying temperature from 63° to 165° F. A description of one of these springs must answer for all, as many of the characteristics are the same. One of the most beautiful in the basin is Cleopatra spring, named by an early visitor. It covers an area of three-fourths of an acre and the mound on which it is found is forty feet high. Dr. Peale speaks of it thus:—"The spring has light blue tinted water in a white basin, with light yellowish red edges. A large flat basin surrounds the spring. At the east end are basins lined with reddish tufted material. The greatest overflow escapes at the west end, and the basins here are fringed with stalactitic masses. The basin at the edge of which these stalactites are most prominent is eight feet high. Below it the water flows over an incline, at the base of which are handsome white, red and yellow basins. The whole front of the mass is lined with these basins, and on the west side, where the overflow was in 1871, they are snowy white. The amount of water is very small in comparison with the amount of deposit. It sinks out of sight at the base of the mass. This spring has a temperature of 154° at the edge. As the water escapes, it flows over a ladder that has been placed against the edge, for the purpose of coating articles that are hung on it. The rate of deposition, under favorable circumstances, is about one-sixteenth of an inch in four days (96 hours). It is almost impossible to describe this mass and the basins that compose it, in words. The spring is 20 feet below the terrace, immediately back of it."

H. Z. Osborne, president of the Even-

ing Express Company, one of the editors and publishers of the *Express* of Los Angeles, Cal., made the tour of the Park, last July, and from his letters published in the *Express*, I will quote an experience of his at Mammoth Hot Springs, as follows: — "The most notable are the Minerva Terrace, the Jupiter Terrace and the Cleopatra Terrace, and Cupid's Cave underneath what is called Cleopatra's Bowl at the top of this terrace, is the most exquisite in coloring of any. Should Cleopatra ever desire to bathe in this bowl, she would find it constantly supplied with boiling hot water, which comes out fairly hissing at one side of the formation. The overflow passes into Cupid's Cave underneath, running over a side consisting of fluted columns, four or five feet in length, and of great number, before dripping into the cave underneath. About a mile and a half back from the hotel I found a beautiful body of tepid water, in a wood, and a board announced it as "Bath Lake." I took the hint and had a delightful bath. It covers something less than an acre of ground, and on one side the hot water comes in strong, bubbling up a couple of inches above the surface, and on swimming over I found that the heat steadily increased in that direction. The water is quite deep, except about the edges of the lake. I spent a half hour very pleasantly swimming about and experimenting as to how near one could approach the source of supply. * * * I climbed down a ladder fifty or sixty feet into a cave in the 'formation' called the 'Devil's Kitchen.' At the top there was barely room to crawl through, but it gradually widened to fully twenty feet at the bottom. The walls, which were covered with hard globules about the size of a walnut, gave ample evidence that this had once been the interior of a large boiling spring. I went as far laterally in the fissure as the light would permit, but I could not see the end in either direction. The air was exceedingly close, and six or eight feet below the ledge on which I walked I could see water but I could not tell whether it was cold or hot. Two or three bats, disturbed by my presence, flew back and forth about my head in a very careless fashion. On reaching the surface I found the fresh air most welcome."

NO. VII.

[From the Amherst Record, Nov. 21, 1888.]

On Friday morning, August 31, the Raymond party were up with the sun,

ready for the hardest day's jaunt in the grand tour. Having breakfasted early, all went to their rooms to prepare their hand baggage to take with them, while they checked their valuables, and trunks, valises, etc., at the hotel office. About eight o'clock we saw the coaches, four-in-hand, drive up from the barn in front of the hotel. Some minutes elapsed before the party were separated into groups and assigned to the different coaches by Mr. Cook and the transportation company's foreman. To one not accustomed to excursion parties, this would be no trifling matter; for the real enjoyment of the trip depends very largely on the success of such a division as the one in charge is obliged to make, and when once assigned, the order is kept until the stages return. There are different kinds of temperaments to please, and how to mate such a promiscuous lot of strangers so that everything shall harmonize, is a gift, a trade that the conductor of excursion parties acquires by long experience and continual contact with various kinds of people *quot homines, tot sententiae*. There are always —most always—one or more cranks and kickers aboard, besides the dude. Some are dressed in fine clothes with diamonds and jewelry, and others are plain, common sense, everyday folks with their homely expressions and uncouth manners; some are *sui generis* but agreeable, and some are *sui generis* and disagreeable, while only a few can adapt themselves to every situation and be everything to all people, at all times and in all places. It was the good fortune of conductor Cook, as well as of each of the tourists, that our Raymond party was composed of happy, good natured people, who had paid their money to enjoy themselves, and all seemed bent on making the most of their vacation and securing as much enjoyment and information as possible. Everybody was pleased with the gentlemanly and accommodating Mr. Cook, who looked after each member in his charge and guarded their welfare as the apple of

his eye. He attended to every detail at the hotels and en route, and no more obliging conductor was ever sent out to look after a company of tourists. This, I learn from those who know, is characteristic of all of Messrs. Raymond & Whitcomb's men. And no doubt to this fact is largely owing the success which has achieved for them their world-wide reputation.

On the seat of the forward coach sat Tom Casey, the efficient and careful driver, selected for his efficiency and skill to lead the procession, and D. W. C. Ward, a New York merchant, and the writer on the seat with him. Inside the coach were Mr. McLean, a lumber merchant of Boston, Mrs. McLean, Mrs. Williams, Mr. Dodge and son of Newburyport, and "our lecturer," Mr. Strong, a boot and shoe merchant of Georgia. Some of the way the first coach had the advantage in escaping the dust. This was only when the wind was in our faces, however, and at other times we caught bushels of the palpable powder that was several inches deep in the road and as dry as if there never had been any rain. The horses are fresh, and, at the crack of Tom's whip over the leaders, we set out for a good day's journey through a country entirely different from any we have heretofore visited. We pass the formation or Terrace Mt., also the soldiers' headquarters and barracks, where a high private hand us a circular letter from the secretary of the Interior. For the benefit of all in the coach it is read aloud, and each of the party becomes acquainted with the rules of the Park, and now there's no excuse for violating them through ignorance, for here as elsewhere in the wide domain of Uncle Sam's jurisdiction, ignorance of the law excuses no one who violates the law. We pass up the Gardiner Valley, and for miles we climb the mountain, rising 1100 feet higher than the hotel we have left behind us. Two or three miles brings us to the Golden Gate, that wonderful piece of engineering where the road is built on a curve and

seems suspended on the side of a high wall of rock almost in mid-air. The limestone Hoodoos are on our right. These are composed of extinct geyser formation and formerly was the scene of boiling springs, which in the centuries now past were doubtless as formidable to look at as anything in the Park. We notice Sapphire spring, a pretty pool of delicately colored or tinted water, perfectly transparent. By the way, these springs and other natural objects are most of them named. The name is painted on a strip of board and attached to a tree, post or something of the kind. The government has caused most of the prominent objects in the Park to be named in this manner. We rise till we go through Kingman's Pass and find ourselves on the broad table-land or plateau, 7,300 feet above the sea, and our landscape broadens and takes in a wide stretch of the entire Park in all directions. On turning around, our driver points out to us, off in the distance, Bell's peak, Sepulchre mountain, the snow-capped Quadrants and other lofty peaks that seem so near and yet are really so far away. While coming up the narrow defile or cañon, before emerging upon this plateau, we pass Bunsen mountain on one side and another steep cliff on the other.

While this table-land gives a good idea of the Rocky mountains and the scenery is picturesque, it is far less romantic and intensely grand than in the Royal Gorge and cañons of Colorado through which is built the Denver and Rio Grande narrow gauge railroad between Denver and Leadville. But here as elsewhere there is a fascination which the writer, especially, never tires of, and even breathing the pure air when not laden with dust is animating and inspiring. In coming up the valley, we note Rustic falls on one side and Holmes peak off to our left. Scattered over this table-land are beautiful streams, and sheets of water. It is somewhat surprising that away up here from 7,000 to 8,000 feet above the ocean we find such large lakes and ponds among

the hills and buttes. Here is Swan lake, a pretty tract of water. Beyond is Indian creek and then Willow creek. Soon we reach the mountain of volcanic glass, of which I have spoken. The guide book makes considerable of this mountain, and tourists generally manage to secure specimens of obsidian to carry away. Doubtless, in this respect, the Yellowstone Park is represented in every part of America and beyond the sea. Near Obsidian cliffs is Beaver lake. The road skirts the lake, which is separated into three or more divisions by dams built by beavers long ago. These dams are grassed over on top, showing that the animals have ceased working and when civilization put in an appearance, doubtless they retired to other and more secluded quarters. The beaver is a hard working animal, and can teach engineers something in his methods of constructing dams. But they are not fond of civilization and never work to be seen of tourists. On the waters of Beaver lake we notice a flock of wild geese happily paddling about, as unconcerned as though a cordon of soldiers stood continually keeping guard; yet their freedom and careless movements would make an old hunter turn pale with envy. Now we come to Twin lakes. But why call three lakes twins? Triplets seems more appropriate. Next is "Roaring" mountain; but no one hears the mountain roar; we can only imagine the roar; it's all in the name, perhaps. We pass Bijah's spring and Sulphur spring. We take a long breath, get a good whiff of sulphur and think the spring is rightly named.

We reach Norris Basin hotel about noon. The altitude here is 7,330 ft. After partaking of an excellent dinner, the members of the party stroll down quarter of a mile where the road forks, and turning to the right we come to a little hill, and here we see steam issuing from the ground in every direction, hear hissing sounds like that of nests of serpents, and the smell of sulphur is too strong for sensitive nerves. The first view of the country about here

fills one with amazement. All the picturesque scenery is forgotten for the time being. The ground on which we tread softly is covered with a white, shelly material, not unlike ice or chalk broken into very fine pieces and almost powdered, white as the driven snow, as the saying is. There are small hollows in all directions that once were geysers or boiling springs; these are properly craters to extinct geysers, nearly filled up with the same material as surrounds them. There are acres here and there covered with living geysers, fumeroles and steam vents. It is a dreadful place to sit down and contemplate or walk about carelessly. The ground sounds hollow when one steps, even lightly, and in spots the crust seems pretty thin and ready to break through. It would be just the place for the suicide to perform the last tragic act. A step or a jump would land a person in eternity in an instant. Off to the right, a short distance, is a long ridge, rounding on top and sloping on one side, covered with white material and, like a river overflowing its banks, the surface covered with hot water all about here. It is too dangerous to travel over, on account of the craters and vents scattered everywhere. Down the slope, off on the level with no formation or cone surrounding its crater, is "Constant," which splashes perpetually and throws large volumes of hot water, like a foaming fountain, twenty, thirty or more feet high. The water falls back into its own basin. The crater is a large one, and this geyser is probably watched at a short distance fully as much as any in the Basin. Near the road are the "Twins" and the "Triplets." Not far from the road, too, is a huge boulder, down by one side of which is a deep pit, and out of this pit issues superheated steam with an awful roar that makes the ground quake. It is called "Steamboat Vent," from its terrible noise. It blows off like a steam engine every few seconds, when the steam, heated under pressure, hotter than ordinary steam, scorches everything before it.

Should a person chance to bend over the pit at the right moment either his head would be blown off or he would be terribly burned, and would be likely to suffer from the effects of steam for some time. Not far away is "Emerald Pool," with its transparent water of bluish green tint, and large, deep bowl, full to the brim. Then there is "Hurricane" geyser, one of the recent out-bursts. and one of the most gigantic displays in this region.

The "Monarch" is the largest of the geysers in this group. It erupts once daily and sends a column of hot water from 100 to 125 feet high. It has three openings or craters, 5x6, 2 1-2x11 and 2x12, respectively. The best it would do for our entertainment was to keep up its terrific rumbling and sputtering. Off to the right of the road, among the small pine trees are many mud geysers. Some of them are quite large, and ever boiling and bubbling, they keep the surface in perpetuation or at short intervals, throw out mud that sticks worse than *political* mud. Many pools are clear and transparent, others present a muddy appearance, and their consistence varies from dirty soapsuds to inky black mud-paste. But all these objects are viewed with astonishment, most of the Raymond party never having witnessed anything of the kind before. The Norris Basin is the loftiest one in the Park, and its pools and geysers are of comparatively recent origin. It is situated near the head waters of Gibbon river.

After lingering about the formation for an hour or so, the coaches drive up and we take our seats for the afternoon ride. Three miles brings us to Elk Park, a favorite resort for the elk, from which it derives its name. It is stated that large numbers of that noble animal have been seen on this park in the winter season and are easily destroyed by those who wantonly engage in that pastime. There is nothing of especial interest between Norris, or the Half-way basin, and the Fire-

hole or Lower Geyser Basin. For miles we drive at a good rate of speed through Elk Park, which is covered with vegetation, and skirted by forests. We pass up Gibbon cañon and the driver stops the coach to inquire if any of the party desire to make the descent into the cañon, and see the beautiful Gibbon Falls. The wall of rock on one side of the cañon is 2,000 feet high. The road winds around up the cañon, and we see but few objects that interest us. I believe Beryl spring and Lemon creek are on the route.

We arrive at the hotel about six o'clock, having traveled forty or forty-two miles, over a very dusty road some of the way. We are assigned to our rooms, and after doing ample justice to a good supper, served by neatly attired lady waiters, we stroll down a quarter of a mile along the bank of the Firehole or Madison river, where we were told we might see beavers building their dams. We see the dams, but not a dam-builder puts in an appearance while we wait patiently for them to come forth. It was evidently their night off, and they have no intention of coming out to show us how they construct their dams, at twilight.

The weather during the day was beautiful, not too warm nor too hot, but about right for a comfortable journey. We spend an hour, sitting in silence on the bank of the Firehole river, anxiously hoping to see the little fellows come forth to their night's task; but we wait in vain, and our little gathering seems like a certain spiritual seance once held in Amherst, when for hours the spirits were coaxed to come to earth and cut up their didos for amusement, but stubbornly refused to amuse or be heard that night, because in the "circle" was one with a dark lantern brightly burning beneath his under garments. The spirits and the beavers will not exhibit their tricks to be exposed. We return to the hotel, believing thoroughly in the beaver hoax.

NO. VIII.

[From the Amherst RECORD Nov. 28, 1888.]

Saturday morning, the first day of September, found our party much refreshed after a good night's rest and up with the lark ready for the journey of another day. The ground was covered with a white frost, water froze in pails on the hotel piazza, and the thermometer registered 34 at 6 a. m. Guests gathered around the large stove in the office until breakfast was announced, while the "evening star" in the parlor roared like a geyser and poured out heat to make the room warm and cheery. Speaking of frost reminds me that according to report it frequents this region every month in the year, and judging from the perpetual snow we see upon the mountains, the temperature in the valleys can not be depended upon. There are some sixty guests at the hotel and cottages. Near here is a camp where twenty to twenty-five ladies and gentlemen from Montana, Dakota and one other state or territory (I have forgotten what one) are enjoying life in the primitive style. They have a large herd of horses and the way the young ladies ride would be a caution to novices in the art in the East. They are perfectly fearless and their steeds go dashing away, their hoofs sounding upon the hollow earth as if the crust was very thin. They bring their packs with them, and this includes a full wardrobe, a complete line of cooking utensils, canvas, everything but firewood, and it is astonishing how much can be carried on a pack-horse. Parties come in this way from long distances. I chanced to meet an old hunter by the name of E. W. Robbins who with his wife and boy had come over one hundred and fifty miles to spend a week in the Park. They came from Montana in saddles over the mountains direct and not by Shoshone or any other well marked route. The boy was only seven years old, born in a mountain cañon, his father said, and he rode his pony like a little man. The wife, the mother, rode her little mule,

and an extra horse carried their goods and chattels. Those who have seen this country can imagine how difficult it must be to thread their way through the forests, often without any trail, where trees are blown down in all directions and streams and pools, hot springs and marshy places render it dangerous even for a foot-man. After conversing with the camper, I discovered him to be quite intelligent and interesting. He hailed from one of the states east of the Mississippi, served in the civil war, lectured on his system of mathematics winters, and hunted deer, elk and other large game on the mountains as a business. Then he told me his story, how he was first induced to seek the mountain life. When a young man he suffered with a pulmonary disease, which threatened his very life, and brought him by hemorrhage to death's door. He sought the rarefied air of high mountains, as the only means of continuing life. On high altitudes he lived for years, his mule and his rifle being his only companions. It had the desired effect. His health improved, his disease was checked, his lungs grew strong and able to do their work. He had bought him a ranch in Montana and now lived at a lower altitude most of the year. He had become fascinated with this wild life and each season spent weeks on the Rockies with his rifle. He appeared well acquainted with all the country about here, and familiar with all the hunting grounds, and could spin yarns by the hour as interesting as any old sailor's. He said the geysers and grand cañon had great attraction to him and his wife, and they had been in the habit of coming here in past years.

Hundreds of campers come into the Park during the tourist season. They come from the states and territories and to them with their faces well bronzed, it is an "outing" indeed. Some drive in canvas covered wagons, others in open vehicles, while others still transport themselves and families in the manner I

have mentioned. They usually pitch their tents near some cliff or where there are cold mountain springs and plenty of grass for their horses. The soldiers keep guard and their surveillance is constantly necessary from the time they enter until they break camp, fold up their tents and quietly pass out. Extinguishing their camp fires is one of the rules of the Park, and the soldiers are compelled to rigidly enforce this order.

A few rods from the hotel, is the "Fire-hole" river; hence in the Park the place is most frequently called "Firehole." A log has been placed over the river for those on foot to cross; but teams and coaches ford the stream, which is hub deep. This is one of the principal streams of the Park, and derives its name from the fact that it has its source in this fiery "hole" among geysers and hot springs whose waters flow into it and keep it continually hot or lukewarm. Before it enters the Gibbon cañon, it receives the waters of the Gibbon river, another important stream. Beyond the geyser Basins it is more often called by its real name, Madison, given to it by Messrs. Lewis and Clarke. The Madison, the Gallatin, and the Jefferson are the three principal tributaries that unite at a point north of the Gallatin range of mountains to form the big Missouri or the great "Muddy" as it is called.

At seven o'clock, the stages drive up to the hotel and the passengers once more take their seats. There are no geysers in the immediate vicinity of the hotel, but the Basin is one of the largest in the Park, covering an area of about forty square miles, over which, in groups, are scattered nearly seven hundred springs, besides fifteen to twenty geysers. I will quote the following from the guide book:

—“The central portion of the valley is a flat plain, six or seven miles in width, partially timbered, but mainly bare, and covered with either spring deposits or marsh. In some of the elements of beauty and interest, says Prof. R. W. Raymond, the Lower Geyser Basin is superi-

or to its more startling rival. It is broader and more easily surveyed as a whole, and its springs are more numerous, though not so powerful. Nothing can be lovelier than the sight, at sunrise, of the white columns, tinged with rosy morning, ascending against the background of the dark pine woods and the clear sky above. The variety in form and character of these springs is quite remarkable. A few of them make faint deposits of sulphur, though the greater number appear to be purely silicious. One very large basin (forty by sixty feet) is filled with the most beautiful slime, varying in tint from white to pink, which blobs and spits away, trying to boil, like a theologian forcing a laugh to please a friend, in spite of his natural specific gravity. The extinct geysers are the most beautiful objects of all. Around their borders, the white encrustations form quaint arabesques and ornamental bosses, resembling petrified growths. The sides of the reservoir are corrugated and indented fancifully, like the recesses and branching passages of a fairy cavern. The water is brightly but not deeply blue. Over its surface curls a light vapor; through its crystal clearness one may gaze, apparently to unfathomable depths; and, seen through this wondrous medium, white walls seem like silver, ribbed and crusted with pearl. When the sun strikes across the scene, the last touch of unexpected beauty is added. The projected shadow of the decorated edge reveals by contrast new glories in the depths; every ripple on the surface makes marvelous play of tints and shade on the pearly bottom. One half expects to see a lovely naiad emerge with floating grace from her fantastically carven covert, and gayly kiss her snowy hand through the blue wave. In one of these *langs* the whitened skeleton of a mountain buffalo was discovered. By whatever accident he met his fate there, no king or saint was ever more magnificently entombed. Not the shrine of St. Anthony of Padua, with its white marbles and its silver lamps, is so resplendent as this sepulchre in the wilderness.”

The distance from "Firehole" to the Upper Geyser Basin is ten or twelve miles. The altitude, at the former hotel is nearly 7,300 feet, and the hillsides about here are heavily timbered. The first objects we view are the Thud group of springs, covering about sixteen acres of territory. One of the most important

geysers in the Basin is the Fountain. It is situated on a gentle slope, conspicuously near many smaller springs and geysers and only quarter of a mile from the Thuders. The spring itself is 20 by 30 feet and outside surrounding it is a shallow basin 100 by 120 feet. In the center of the spring is the geyser tube. It erupts every two hours, boiling twenty minutes before it erupts and plays for twenty minutes. Immediately before it discharges its pent-up force, the water is 290 degrees Fahrenheit. Within the pool and outside the spring, are two smaller basins, that are very deep and the largest of these is fifty feet across, and the water is of a greenish tint. The column of water, six or eight feet in diameter rises to a height of 20 to 30 and jets spurt to perhaps fifty feet. The huge column foams and falls in spray, like a fountain. Soon after the eruption ceases, the water sinks below the rim. This was the finest display we had thus far witnessed.

Our attention is next attracted to smaller geysers near by and then we visit the famous Paint Pots. These latter are volcanoes on a small scale. They throw out mud of various colors, but mud that will stick like prairie soil when wet. They cover quite an extensive area and in one place they seem to combine their energy to form a lake of mud. This lake is not unlike a great mortar bed where hundreds of barrels of lime is slaking. The mud sputters and boils and occasionally a bubble bursts, throwing out its colored paste in delicate and fantastic forms, sometimes resembling the rose or other flower, or perhaps a tiny leaf. A soft rose color and rose tints predominate. But these tints, however widely in contrast in the Pot, when taken up and exposed to the air, I imagine, are all alike when dry. There is no stability to the color, and the tourist will find this is characteristic of the ground all about here. If he is not continually on the alert, he may slip into a dye pot and wish he hadn't. No painter or artist makes

richer tints in his studio than those here seen; but they are worthless to carry away. Any specimen, cut out in a block, or brick form, smuggled through the Park, will crumble and fall into a very fine powder before it reaches Massachusetts. Nature mixes her paints to be admired here, and not for utility and ornaments elsewhere. One can cut the substance with a common pocket-knife, easier than he can colored chalk, which it resembles.

NO. IX.

[From the Amherst Record, Dec. 5, 1888.]

About midway between Firehole and Upper Geyser Basin is a most interesting group of objects, including Excelsior geyser, Prismatic lake, and a score of springs. Here in this region, as everywhere, every striking object whose characteristics are forcibly suggestive, is called by some appellation of old Satan. But why call the most profound and singularly wonderful works of Nature by such names as suggest the presence of the Devil? There is always a disposition to call strange and mysterious things by such titles. And so it is here, as if his satanic majesty was omnipresent and his power was guiding and controlling the forces that center deep in the caverns of the earth. On account of this superstitious belief, or for some other reason, we have quite a list of names of objects which are titles applied to Satan. Before we came to the reservation we were introduced to the Devil's Slide, a regular Satanic toboggan, of the oldest and latest style. Then within in the Park we find the Devil's Kitchen, the Devil's Punch Bowl, the Devil's Thumb, the Devil's Nose, the Devil's this and the Devil's that; they are all the Devil's, and must have been christened by some one familiar with demonology. So the place where, with my readers, we are now visiting, is "Hell's half Acre," and, of course, the old Gentleman is present here, if any where in the Park. A very appropriate name, certainly, if this

is his abode, and the incarnation of evil mations; they are full of channels, beau-
be confined within such close quarters tifully tinted, and extend back obliquely
and condescends to dwell in such a fiery, so that a person in approaching the edge
watery pit. Well would it be, if it were is over the water, and if the edge should
true; for then civilization would know give way would be precipitated into the
just where his presence was. But the caldron instantly. The structure of the
real name, which is heard and spoken less walls was evidently formed before it be-
often in the Park, is a better name. came a geyser, as stones weighing from a
the name "Egeria," a zoological term. few ounces to 100 pounds are broken
This group is also called The Midway or off and ejected by the tremendous force
Half Way Group. But what about the two when the eruption takes place. Our driver
objects I have mentioned? First the Excelsior is, without doubt, the largest geyser
in the world to-day. It may not be to-
morrow; but it is at the present time.
Previous to 1880, it was looked upon as
being a great boiling spring, or lake, and
was never known to erupt. The Grand
geyser was the greatest and grandest in
the Park before the Excelsior showed
what power it could develop. The
Excelsior began to erupt in 1880 and
ceased in 1882. Last spring it began
again and the Grand, five or six miles
away, took a rest. Whether these large
geysers are in any way connected deep in
the earth is a mystery that is not likely to
be solved in the present century. But it
is true that when one has been active, the
other has been apparently at rest. The
Excelsior is three hundred and thirty
feet long by two hundred feet wide. The
surface of this plateau is covered with
"geyserite," fifty feet above the Fire
hole river, which is seventy-five feet
across. The road extends along the river
bank, and at a point nearly opposite Ex-
celsior, passengers leave the coaches and
cross the river on a large tree that serves
as a foot-bridge. Within a few feet of the left
bank that slopes down to the water is Ex-
celsior. It is constantly steaming, and a
short time before the geyser "goes off" a
dense cloud hovers over the surface hiding
it from view, except when a current of
wind blows the steam away for a moment,
when one can look down into the awful
abyss of scorching water. The surface of
the lake is depressed twenty feet and the
walls are laminated, peculiar to such for-

mations; they are full of channels, beau-
tifully tinted, and extend back obliquely
is over the water, and if the edge should
give way would be precipitated into the
caldron instantly. The structure of the
walls was evidently formed before it be-
came a geyser, as stones weighing from a
few ounces to 100 pounds are broken
off and ejected by the tremendous force
when the eruption takes place. Our driver
was well posted and understood when
to expect the Excelsior to perform the
grand act and all hands were on the
ground waiting to witness it, about eight
o'clock. We viewed Prismatic Lake and
other springs, and stood around with fear
and dread to see a lake of hot water liter-
ally raised far into the air. We were
not disappointed. For some minutes, the
cloud of steam rose to an enormous
height, and enveloped the whole lake.
The surface was agitated more and more.
Several times we thought it was "going,"
but it would settle back as much as to say
to the powers within, "not this time."
Finally with a tremendous roar from the
infernal regions below, the whole body of
water was shot into the atmosphere to a
height that seems almost incredible. The
height has been measured and is reported
as three hundred feet. It was surely high
enough to be appreciated, and a few feet
would not have added very much to, or
detracted from the spectacle. The earth
thundered and quaked as if infernal mon-
sters were very angry. To each of us it
was the most stupendous out-burst of the
earth's forces we had ever seen, the most
magnificent sight we had thought of wit-
nessing. Think of a lake 350 by 200 feet
lifted by its own force 300 feet in the air!
To those who have studied physics, here
is a fine illustration of the pow'r of steam
under pressure, and in viewing the im-
mense volume of water raised, we also
consider the principle that one pound of
steam is sufficient to raise five pounds
of water of ordinary temperature to
the boiling point, and when at the

boiling point, and converted into steam, the immense power, constantly being added to, is stored up in the caverns of the earth until all resistance is overcome when it belches forth and the terrible eruption is the result. Thus are these changes constantly taking place. Water is converted into vapor or steam by chemical action or other agency; the steam expands, and this latent force is stored up until the extreme limit of holding down the weight is reached, and the pressure being overcome, everything gives way and the lake suddenly rises. Then, too, the atmospheric pressure of fifteen pounds more or less, to the square inch, according to the altitude, must be overcome; and a cubic foot of water weighs about sixty-two pounds. In view of all these well established principles of physics, the force required to send such a body of water so high, is simply astonishing. It is evident that the latent internal forces of the earth must have vent somewhere and in some manner. So this method seems a beneficent provision of Providence to get rid of the surplus energy of the forces that create and destroy; that away up here among the mountains, where civilization can only thrive artificially, are the "blow-offs" of earth, that otherwise might turn populous cities topsy-turvy and destroy thousands of precious lives.

There are many nice points which philosophers and scholars have grappled with; some of which have been settled and the facts given in the official reports of United States officers, and others have been speculated upon and theories advanced. But it is fairly demonstrated that when these forces cease to make an exhibition in one place, new springs and geysers appear in other places, and this whole region is one scene of grand changes extending back into the earliest ages, before events were recorded. In the process of the eruption I noticed stones were thrown higher than the main column of water, and descending they fell like hail stones. These vary in size from hazel nuts to

good sized eggs. I watched one as it fell and secured it for my collection of souvenirs, and will preserve it as one of the choicest. It is white and porous like pumice stone, but how far it traveled before it came to the surface is what no philosopher can tell; it may have been only a few feet, it may have been hurled miles. The volume of hot water was so immense that Firehold river, immediately after the eruption, was raised six or more inches and so hot that one could not comfortably hold his hand in it,

There are two very remarkable lakes, remarkable for their size and marvelous beauty. The largest is Grand Prismatic Spring, measuring two hundred and fifty by three hundred and fifty feet. It is wonderfully and indescribably brilliant in colors and tints. The outer rim is of a bright red deposit and between it and the deep greenish blue water are circles of gold, orange, brown, dark yellow, and shades of gray and purple, each color and shade being distinctly marked. The other is Torquoise Spring, with its long, trough-like shape, filled with intensely blue water, and has a white bottom and brown and salmon colored edges.

Not far away is a deep, blue spring with a beautiful basin and water as cold as ice. To me this was a most wonderful place,—wonderful to see large lakes of boiling hot water and only a few feet from them an ice-cold spring. But then we have seen a boiling river and a cold stream flowing side by side, and volumes of hot water and steam pouring forth from the bed and sides of quite a large river! What can be more wonderful than these phenomena?

From this Midway Group we speed our course to the Upper Basin. The way is not particularly interesting. We pass down among the hills and come upon another long, narrow plateau or valley, the southern limit of the tour, arriving here at 10.55 A. M. The hotel is near the upper end of the valley. The altitude is 7,330 feet. This Basin contains over 450 boiling springs that have been named, and

the most important geysers in the world. The Basin occupies an area of about four square miles. The Firehole river in its winding course flows nearly through the center of the valley which extends a little west of due north and east of due south. All about, on either side of the river, sometimes near the river's bed and sometimes a short distance away, are groups of old spouters, doubtless centuries old, and young spouters in the prime of their vigor; little pools and big pools, springs of cold water and fountains of hot water, and pots of mud; geysers with chimneys and geysers without chimneys. They all have one thing in common and that is an orifice. Somethings, says the young philosopher, are impossible in this world; even the Almighty cannot make two hills on a level without a valley between them; so you cannot have a visible geyser, a pool, or a spring without having an orifice. These openings vary in size from a few inches to several feet across. Some are just large enough to take in a fashionable Cinderella slipper at dusk and compel the wearer to carry a specimen of the Park back to Mammoth Hot Springs. Some of the largest geysers have accidentally nearly swallowed up careless tourists. Here and there a geyser has built up a formation ten, fifteen and twenty and twenty-five feet above the level of the plain, and is surmounted by a chimney or cone. The hotel stands on the left bank, about 30 or more rods from the river. West and north of the hotel are high cliffs and between the latter and the river are small tracts of open land covered with a rank growth of grass and patches of forests of scraggy pines. Northwest of the hotel, near the cliffs runs a tributary or fork of the Fire-hole river, and along its banks are numerous small hot springs and geysers, and pools of colored mud; craters, too, of extinct springs and geysers are scattered all over this plain. Near the cliffs, also, is a formation several feet high, composed of a white sandy sediment as barren and desolate as the devil's garden on Mt. Holyoke

range in Hampshire county, Mass. Many of these geysers are active and sputter incessantly. Here too, is the Devil's well, the Chimney cone, the Crested pool, the Cliff geyser, the Fortress, the Brown spouter and many others that, to a stranger on a quiet Sunday, meandering about alone, suggests unpleasant thoughts as he walks carefully and suspiciously over the singular formation listening to the gurgling, hissing springs, many of which are not visible a short distance away. Not far from here, near the highway and a little to the north, is a very high mound of geyserite with what was once an orifice at the top. This is an extinct geyser called the White Pyramid. In this vicinity are a number of beautiful pools and springs. One of the most delicate objects in the Park is Morning Glory pool, that rises to the surface on a level with the path at its side. Its waters are of a bluish tint, transparent as crystal and the naked eye can pierce to enormous depths. The walls are pretty, being circular in shape and covered with a transparent coating of the richest hues. Near here is Pebble Lake, where tourists procure tiny pebbles and stow them away in their pockets when the soldiers are not watching.

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NO. X

[From the Amherst Record, Dec. 26, 1888.]

A writer has described the Morning Glory pool as follows:—"It is precisely like a morning glory flower. Its long and slender throat, like the tube of the blossom, reaching from unknown depths below, branches out in ever widening snowy walls, forming at last a perfectly symmetrical and exquisite chalice, which is filled with water of the loveliest robin's egg blue. The rim of the chalice is delicately and regularly scalloped, and is edged with a tiny line of coral."

From the hotel piazza a score or more of the largest spouters can be seen when in action, and at all hours of the day some one, perhaps half a dozen of these will be sending up columns of foaming hot water and steam at the same time. Far upon the sides of the surrounding forest-clad hills

will be noticed steam rising like clouds of mist on a damp morning. The first geyser inquired about, is "Old Faithful," that stands like a sentinel at the head of the valley within 50 rods of the hotel. No sooner had our party arrived than word was passed around when to expect the grand sight, and no one was disappointed. Watches and chronometers of every sort will vary, but "Old Faithful" remains steadfast day and night, year in and year out; in fact, all time pieces may be set by this old king of the geysers. Now, it would be presumption on my part to hope to add anything new to the volumes that have been written and spoken concerning this famous spouter, and here let me be understood as not assuming the discovery of anything new for those who have visited Wonderland and beheld with their own eyes these natural wonders. While standing before "Old Faithful", so near as to catch hot spray on my face, I recalled the description given by the good Prof. Stockbridge upon his return from the Yellowstone, some three or four years ago, and I only wished he was present with us, as he is always so interesting and instructive. The eruptions of Old Faithful occur at regular intervals of sixty-five or sixty-six minutes, and each lasts from five to eight minutes. The height to which it throws hot water is 125 to 175 feet, and the steam rises far beyond this great height. Approaching the wind ward side, one can stand quite close to the crater, but the danger is that the wind is liable to shift around and then it isn't either safe or pleasant to be too near. At the hotel, the view is fine, but you do not feel the effects of the awfulness of the power within the earth unless you are near the orifice. The sediment of the water has slowly but surely reared a chalky white formation around the center of Old Faithful which serves as a pedestal, fifteen to twenty-five feet above the plane of the valley. The cone is eight feet above the formation, and is two by five feet on the inside and four by eight on the outside.

The inside of the cone is of irregular shape; the surface is covered with nodules from a small berry in size to an English turnip or larger, and the whole is coated with a transparent substance which undoubtedly is largely silica. This formation or pedestal is composed of layer after layer, forming tiny terraces and raised so gradually as to render the latter almost unnoticeable. Each terrace has its shallow bowl and after the eruption of the old geyser the water trickles down in little rills and spreads out over a large surface, extending beyond the hotel in distance, before it soaks into the ground which is kept continually wet, causing it to be disastrous to shoe leather. The work of a city boot-blacker is very soon destroyed and the tourist quickly finds that old clothes are the things to wear in the Park, and he will not find much use for shoe polish and fine linen. For some minutes before an eruption the crater steams violently, and fills with boiling hot water. By and by the earth seems to fairly shake beneath our feet amid the terrible roaring and rumbling within its bosom. Instantly we witness a few splashes of hot foaming water that fills the crater to the brim and flows over and down the formation. This is followed by steam hotter than the ordinary boiling point. Then all is quiet again. In a minute the same phenomena take place and perhaps the water spurts spasmodically a little higher. Pretty soon a white column shoots into the air like a rocket, 20 or 30 feet, and with each pulsating wave of the tremendous power below, rises higher and higher until it reaches its greatest height of 125 to 175 feet. Straight as a marble shaft, swayed this way and that by the breezes, with delicate snowy folds bending gracefully over, the majestic column of foaming water falls in a gorgeous cascade to the earth, suggesting to the writer standing a short distance away the laughing falls of Minnehaha, while the sun in the western sky, pouring its rays obliquely upon this beau-

tiful scene as if to render it more complete in its loveliness, brings out all the colors of a genuine rainbow. In a few minutes the pressure is exhausted, the hot water recedes from the brim of the crater, and then follows the blowing off of the steam like a big steam boiler, lasting for some seconds. After the eruption, one can approach the crater and see its inner formation with comparative safety; but it is very dangerous to get near it during its fitful outbursts, as the steam, accompanied by hot water, blinds the eyes, and renders a person liable to fall into this boiling abyss and be swallowed up or burned to death. Thus have several persons had narrow escapes at the orifice of Old Faithful. Only on the fifth day of August, a young lady stepped up to the mouth of the crater, when a gust of hot steam met her in the face and she fell back into the arms of a soldier who sprang to her rescue just in season to receive a severe scalding on his limbs. The lady's life was saved by this soldier; but the latter suffered from a badly burned foot and arm and was confined several weeks in the barracks. For his act of bravery this private, John Coyle of Co. B of the 22nd infantry, received a certificate from the commanding officer commanding him for his daring and courageous deed, a testimonial that was pleasing for him to show.

The interior of the crater is beautiful beyond description. The nodules I have mentioned, are also covered with small globules and the whole mass is irregularly but beautifully colored and tinted, the predominating color being gray or ash, modified with lighter and some darker shades, verging into crimson and yellow. The surface of the walls is very hard both inside and outside and a scratch soon coats over and remains transparent until the coating becomes opaque. Then too there are fibers or threads of a hard substance that is quite brittle. The process of formation is very slow, and one relic fiend can do more damage in half a minute than the old spouter can perhaps re-

place in a century. For this reason the rules are very strict, and soon as a party leaves the hotel, one or more soldiers puts in an appearance. The latter are omnipresent, during the tourist season, and after that these famous spouters have no audience, save the man at the hotel, but are said to be more grand and magnificent during the winter than at other seasons of the year. Some of these geysers must be of great age, as evidenced by their castles and cones. Old Faithful has been spouting, certainly since 1804, when Capts. Lewis and Clarke made their noted exploration into this section and over the Rockies to the vast unsettled country beyond. And then, in view of what is known, when the eye beholds the remains of extinct geysers, the imagination goes back to the ages before events were recorded; and in later times doubtless the aborigines were the only ones to witness the grand sights as they scaled the heights and looked down with superstitious awe upon the valley, when Old Faithful was as true to its name as now.

It was a fortunate time when our party visited the Upper Basin; for we saw a large number of the most prominent geysers here perform their grand acts, as though they did their best for our especial benefit. Two in particular deserve notice in this connection. I refer to the "Bee Hive" and "Old Splendid." Now how is it that most tourists become familiar with the fact that three of the large geysers are acted upon by an alkali, when "soaping" is not only forbidden but has become almost a by-word, and associated with criminal acts? Photographer Haynes is responsible for a good story to the effect that years ago a Chinaman came into the reservation and pitched his tent over a boiling spring. He supposed he had struck a rich bonanza and found a natural wash tub. He placed his basket of soiled clothes in the spring after thoroughly soaping them. There was an instantaneous explosion, and Mr. Chinaman, drawyers, overalls, undershirts, tent and all, unexpectedly

shot upward in a column of hot water. The celestial, it is understood, came down much the worse for his blisters and fright, and gave for his reason for leaving the Park, "Chinaman heapee no likee Melican man's Spling." From that time the geyser has been known as The Chinaman. Tourists, I am told, have very frequently thrown their soiled clothes in to the crater of Old Faithful and sometimes found them ejected, clean and white. Certain fabrics, however, such as silk, are torn to threads, so it is important that a person should be acquainted with the kinds that Old Faithful is apt to destroy. It is said that a handkerchief thrown into the Indicator of the Splendid a few feet from the main crater, is more than likely to be thrown out of the latter during the first eruption. In 1882, Gen. Sheridan's men washed their garments while in the Park by casting them into the craters. But it won't answer to soap a geyser, and the one who may be caught doing it by the military guardians will not be apt to repeat the act. It is prohibited for the reason that it causes the geysers to erupt out of their regular intervals or times and makes them very irregular and less frequent and thus robs them of half of their charm and beauty. Some, however, like Old Faithful do not mind anything about such foolish tricks. The President of the Northern Pacific railroad created considerable stir, only a few weeks before our visit, from the fact that Old Splendid was "soaped" for his special benefit. He was invited to leave the Park, and, is said to have been escorted beyond the limits by a squadron of soldiers. It is singular what influence sometimes seems to be exerted upon the Bee Hive, for instance. Previous to our advent into the Park, this beautiful spouter, located on the formation east of the hotel, on the opposite bank of the Firehole, had been quiet for several weeks; but just at dusk on the Saturday eve of our arrival, through some influence from without or within, it began a series of eruptions that continued during our

stay in the Basin. The Bee Hive is so called from the shape of its cone which is three or four feet high and has a circular orifice about eighteen inches in diameter, resembling an old fashioned bee hive. The orifice is smooth and straight as far as the eye can see. There appeared to be no water in it, the Saturday afternoon we visited the formation, neither was there any steam issuing from it,—all was quiet. What started its activity, I am unable to say; I only know that some of our party were walking over the formation at twilight when suddenly we heard a tremendous noise like the roar of a storm upon the ocean and the ground trembled like an earthquake, and we felt the shock and saw a stream of hot water dart straight upward from the Bee Hive twenty, fifty, seventy, a hundred feet, and before our astonished eyes it ascended higher and higher with each beat of the pulse within, until, we are told, it reached a height of 200 feet. It was a grand sight. There is no such thing as describing it. One can only comprehend its immense power and appreciate the scene by witnessing it for himself. No conception can give one any correct idea of its wonderfulness, and those who witness these geysers will almost question their senses, so marvelously strange are these phenomena.

Another of the finest and most powerful geysers, we were most fortunate in witnessing while in eruption; Old Splendid. It is situated nearly or quite a quarter of a mile from the hotel, and nothing marks it as a geyser while inactive, being simply an ugly looking hole in the earth with dark colored walls of very irregular shape. Both the Splendid and the Bee Hive performed during the night and several times during Sunday and Sunday night. While walking out, Sunday p. m. I joined two of our party who were waiting, anxiously hoping to see Old Splendid go off. For an hour we watched the crater fill with boiling water, overflow the formation and then recede. Finally, a large column of hot water mingled with steam

arose to a great height in the air, and the sun, then nearing the clear western horizon, played with its beams in the downpouring torrents to the delight and admiration of the bystanders. The scene, enlivened by the glory of a bow of promise, was a marvelous one, even more gigantic in its proportions than Old Faithful had exhibited. All those who had so quietly and patiently waited felt well paid for their trouble. A few years after the Splendid was first photographed, some ladies, (as you know many are more observing than gentlemen) noticed William Cullen Bryant's profile in the picture, and now Photographer Haynes, in his lecture, which is accompanied by stereoptican views of most of the objects in the Park, throws a large photograph of Old Splendid on canvas, showing a fine profile view that resembles very much the famous poet and native of Hampshire county Mass.

Still another scene which, in some respects, outrivaled anything we had yet witnessed, was the eruption of the "Oblong." This is a large pool right on the edge of the bank of the Firehole and is, as its name implies, oblong in shape, over 30 feet wide by 50 or 60 long. The rim is raised a few inches above the formation which it has produced by its deposits. The walls are smooth and speckled but very irregular. Immediately after eruption, the water recedes out of sight and a person can climb down from six to ten feet while steam is still issuing from the mouth of the crater below. There are many autographs and figures scratched on the walls, and by the dates some have been there many years. The eruption takes place once in twenty-four hours, never varying a great while, although not as regularly as Old Faithful. For hours the water boils and is agitated from below. It rises and falls, much as the water does in some of the other geysers, completely filling the basin and pouring over its sides; then sinks and becomes quiet. (I watched this pool on Saturday evening till nearly dark and finally started for the hotel.

Scarcely had I reached the Castle when came the opportunity of seeing the eruption.) After witnessing the Sp'endid, we were determined to see Oblong and waited till we accomplished our purpose. The action is peculiar to Oblong, different from any geyser we had witnessed. There was a terrible thumping under us, and as terrible a roar. The power manifested was simply tremendous. The body of water rose 30 to 50 feet in height, and seemed as large as the top of the crater, with a counter column splashing all ways in the center. Before the geyser went off there were two points of ebullition where the water first began to ascend. Before the power from below got down to earnest work, it appeared fitful, small streams flying up here and there, then the whole body went up with a deafening roar that caused everybody and everything for an instant to shake with terror. The river, not four feet from the crater, was made warm by the overflow of hot water. What enormous expenditure of energy shooting into the atmosphere! Energy that man cannot utilize for his own aggrandizement, wasted upon the air. It is a curious fact that several of the largest geysers have what is termed an "indicator" which is quite playful for a few minutes before the spouter goes off. During the eruptions these miniature geysers are quiet. They are indicators, as their name implies, of what may be expected when their big brothers get ready to perform, and are located only a few feet or rods from them.

Besides those already mentioned we witnessed the eruptions of quite a number of the largest and finest geysers: among them were the Grotto, the Riverside, the Fan, Little Faithful, the Comet and Comet Well, the Minute Man, and the Saw Mill. A gentleman from the eastern part of Massachusetts was taken ill in the Park and did not arrive at this Basin until the rest of the party, except a friend, had gone to the Grand Canon. It so happened that these gentlemen on the day of our departure had the pleasure of witness-

ing the Castle in eruption, undoubtedly as fine a view as anyone could imagine. It is called the Castle from the shape of its cone, resembling the ruins of an ancient castle, and is one of the most prominent objects in the Basin. The cone is from fifteen to twenty feet high, twenty in diameter at the top and is surrounded by a formation reared by its gray and white silicious deposit, 120 feet in circumference, containing a number of boiling pools. The orifice of the cone quite small compared to its diameter and not more than three to six feet across. During Sunday, and on Monday morning as the stages drove by it, the Castle was quite active. It was constantly steaming during our stay in the Basin, and every few seconds large jets of hot water would spurt up fifteen to thirty feet high, and occasionally higher. When it plays, its eruption is accompanied by a tremendous noise that is heard for miles, and the ground trembles like an earthquake; then with great violence hot water shoots up in a column to a distance of 100 feet. It is claimed that there is no doubt of this geyser once being the most powerful one in the Upper Basin.

The Giant is another of the largest geysers that claims attention and belongs to the group that also includes the Fan, Riverside and Grotto. Its cone is raised somewhat above the general surface, resting on a slight terrace formed of geyser deposit and measures twenty-five feet. The cone is very conspicuous, being ten to fifteen feet high, open on one side as if broken down, so that a person could step into the chimney. The Giant showed no signs of eruption while we were present but we heard hissing sounds within as though the water was boiling vigorously. It has a record of throwing a column of water seven feet in diameter two hundred feet high, and its discharge raises the river a number of inches. On the same mound or terrace, near the Giant, is Young Faithful, which was violently active during the day we visited the geysers,

and in due time may rival its more pretentious namesake.

The Grotto, so called from the peculiar shape of its crater, which is hollowed into fantastic arches, beneath which are grotto-like cavities, that act, as the Guide says, as lateral orifices for the escape of water during an eruption. The main chimney is eight feet high and two by six on the inside, which extends some eight or ten feet below the outside surface. A second cone is nineteen feet at the base and fourteen at the top, rises four feet above the surface, and has a quadrangular orifice three by five feet. The basin is sixteen feet in depth and the entire mound is fifty three by twenty-six feet, the centers of the two cones being thirty feet apart. The record of the Grotto is four eruptions daily, and the height is sixty feet

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NO. XI.

[From the Amherst Record, Jan. 2, 1889.]

The Fan, geyser derives its name from the peculiar fan-shape that the column of water assumes in eruption. It has two craters, and the two streams cross each other and present a beautiful appearance spreading out like an open fan. The Lion, Lioness and two cubs from an important group, not far from the Bee Hive and the Giantess. The summit of the mound on which these geysers are located is forty-three feet above the river bed. The Lioness and Two Cubs are near each other; the Lion, the largest of the four geysers is about fifty feet from the other three. Their growls and hisses were incessant, the day we witnessed them. The record of the Lion is that its interval of eruption is about five minutes and the height is seventy-five feet. The Giantess is another large geyser, 400 feet from the Bee Hive, on a higher mound. It has no raised crater but the orifice is irregular in shape but 34 by 24 in its greatest length and width. The eruption occurs once in two or three weeks and is one of the grandest geysers in the Park, sending its column

of water 250 feet into the air.

The Grand has been one of the most important geysers but since the Excelsior began its activity, it has ceased its eruptions, although down in the earth we could hear it sputter as though sometime it would manifest its terrible power. It is located nearly in a line with the Old Castle, drawing at right angles with the river and about the same distance east as the Castle is west of the river. The Turban adjoins the Grand. The latter has a fine record, its eruptions formerly occurring at intervals of 16 to 31 hours, and containing from ten to forty-two minutes, and the height of its column of water extending 95 to 200 feet. Dr. Peale thus describes it:—"A tremendous rumbling was heard, accompanied by a shaking of the ground, and a huge escape of steam. It would be difficult to describe the feeling of excitement with which we saw the immense column of steam and water shoot from the crater to the height of 200 feet. The column was vertical, and accompanied by immense clouds of steam, and the water in falling shook the ground. It was carried up in a succession of jets, the main mass being large, and the highest jets appearing to be forced through the latter. It was the first geyser of any power that we had seen, and we called it the Grand Geyser. The display lasted altogether about twenty minutes, and after it was over, the water sank out of sight in the tube."

There are many other geysers that were interesting to me, but I find that my notes in being expanded are occupying much more space than I had anticipated at the outset. Therefore, leaving the hotel early on Monday morning, the 3d of September, we bid adieu to the Castle and the rest of the old geysers, and pass through the valley of East Fork of the Firehole river, some twelve to sixteen miles, climbing up steep mountains till we arrive on the continental Divide, where we are 8,500 feet above the sea. As we were slowly making our way up the west-

ern slope of the Divide, some on foot and some not leaving the coaches, a panorama of beautiful mountain scenery was spread out before us. The forest was unfolding its rich and gorgeous autumn foliage, and the various colors and vast extent which our vision could sweep, produced a picture that will remain in the memory of most of us when the interest of many other things we have witnessed on our trip will be lost. We pass Mary's lake on the highest elevation, pass down the eastern slope and come to Larry's hotel, which I have already described under its proper head. Our reception, our sumptuous dinner, the primitive style of the "hotel," and Larry's wit will also be cherished long in our memories. After an hour and a half pleasantly spent at this place, we journey on down through Hayden valley, come once again into an atmosphere laden with all sorts of odors, not so sweet as might be, and now and then sniff the air when the sulphur fumes are almost stifling. Two or three miles before we reach Grand Canon, we came to Sulphur mountain. Our road leads down a steep pitch and we see a genuine mountain of brimstone on our right hand and a large brimstone caldron, boiling and terribly troubled, on our left. This is the place, that has given rise to a story which for the benefit of those who may never come to this region, I will briefly relate. Some tourists, whether of the old or the new theology, I am not informed but I should judge of the old, was visiting here, when one of the gentlemen stopped the coach to go and make a personal examination of this mountain. He made his investigation, and quickly returned to the coach, saying to the driver, "Drive on, Hell's only half a mile from here."

Upon entering Hayden Valley, that broad tableland, we catch our first glimpse of the Yellowstone river, since we came into the Park. Several times we ford creeks in their winding course to the larger stream. We see the high range to

the south of us; to the north is Mount Washburn, and other peaks that have served as landmarks during a part of our tour. We enter the ravine down which swiftly glide the waters of the Yellowstone. Sometimes our road is along the brink of its left bank, sometimes a short distance away. We no longer keep company with boiling springs nor sniff the breezes perfumed with sulphurous odors. We have also parted company with geysers, paint-pots and mud-cauldrons. Our prospect broadens. The change is so marked and distinct as to be noticeable. We seem to have entered a different section of country. We breathe a sigh of relief as, instead of fumes of sulphur and hissings and roarings from the infernal depths, we are greeted with pine woods, the chattering of scores of squirrels, and an atmosphere fairly fragrant with the sweet odors of the gums of the pine tree, and millions of pine needles. Our road leads through thickets of pines, often zig-zag and among trees standing so near each other that the passengers become a trifle uneasy and anxious to see the expert driver twist and turn his four horses and coach without grazing the trees. As we near the Grand Cañon, our driver points out one or two spots where it is supposed the Nez Perce Indians crossed the Yellowstone, one day in advance of Gen. Howard and his troops.

We rise to quite an altitude, while the Yellowstone winds down through the gorge; off to our right are the walls increasing in height until they form what has been very appropriately called the "Grand Cañon." We arrive at the hotel in season for a good supper, which we relish, after a somewhat tedious journey over mountains, across plains and through valleys and forests. The hotel is conveniently constructed, and the table service excellent, the food being abundant, nicely cooked and well served by tidily dressed female waiters. The evening air is chilly and grows colder, until the mercury falls below the freezing point and ice forms on

water in pails on the piazza. A fire is one of the necessary things in this climate all the year round. The big stove in the spacious office roars like a geyser as the guests stand about it in the evening listening to bear stories and other yarns to be reproduced and intensified in pleasant dreams among the mountains. Speaking of bears reminds me that they are numerous here, if reports are true, and every night they come down from their lofty hiding places to forage on the refuse material thrown out of the hotel. In this respect the bear does the work and fills the place, in a measure, of the American hog—the kind that wears bristles. The swill-barrel was chained to a tree, and inquiry brought out the information that this was necessary to prevent the bears from tipping it over or carrying it away. I have already described the hotel structure, which is built on the left bank of the yellowstone, within a hundred yards of the Upper Fall. On visiting the latter, after supper, we climbed down twenty-five to fifty feet, and the top of the falls was fifty feet, still lower down. The water in the river above the precipice comes swiftly tumbling in foaming billows over the rocks that form a series of low falls, until it reaches the edge when it makes a leap of 150 to 162 feet into the rocky abyss below. The spray is thrown back into the air and when the sun shines bright and clear little after noon, a rainbow appears with great brilliancy of colors. The distance between the Upper and Lower falls is about half a mile. The trail from the hotel leads through the forest across a deep and narrow ravine on a corduroy bridge, thence up a steep ascent and down into another defile, through which flows Cascade creek. On this creek are Crystal falls, three in number, their combined descent being 129 feet. At the time of our visit there was a drouth, and the water in the creek was very low; but in an ordinary season, we are told, these are among the prettiest water falls in these mountains. Cascade creek has its source

in the southern slope of the Washburn range, and empties into the Yellowstone between the Upper and Lower falls. The trail now leads over a high bluff and down a steep decline hundreds of feet, to a platform built on the rocks that overhang the very edge of the Lower or Great fall. It is a hard path to descend and still harder to climb on the tourist's return. At some points, I have no doubt, the trail is at an angle less than forty-five degrees. Some of the way it requires a wooden railing for a support to cling to as a safe guard or sort of supplement to the strong staff furnished by the hotel management. It is no easy task for one unaccustomed to such experiences to slide down and climb up this deep gorge; but the indescribable scene that meets the eye from the brink of the cataract amply repays one for the undertaking. Once down as low as it is practicable for the tourist to get, and all the inconvenience and unpleasant things are forgotten. One loses himself in ecstasy for the time being, forgets his rheumatism and his aches and pains, and for a few minutes, at least breathes the pure mountain air with freedom and delight, while gazing in profound silence up and down the cañon, and into the rocky depths at the bottom of the falls. The eye sees the sea-green water come rushing around the turn in the river's bed and flow madly down between the walls that rise hundreds of feet above it. For a moment it seems to hesitate at the brink of the precipice, and then pouring over the edge, it falls 368 feet and thunders upon the rocks below. Clouds of mist and fountains of spray rise from the foaming caldron and perpetually bathe the sides of the cliffs and preserve the mosses and lichens and vegetation fresh and green. In striking contrast is this vegetation with the duller colors farther down the cañon. A look again, and the eye rests on the variegated cañon extending for miles with the greenish, silvery stream winding down its narrow and circuitous channel in the bottom until it is lost where

the towering walls seem to meet. Grand is the spectacle, beautiful beyond description. The eye now takes in the marvelous beauty of this enchanting scene. Here is beauty and grandeur combined. See those majestic walls of rock, from 1200 to 2000 feet high dotted here and there with bold pinnacles and turrets; finely chiseled and richly colored; sometimes sloping, now almost perpendicular, then again jutting out over the chasm. Note the variety of colors, the infinite number of shades and hues; see how beautifully they blend and what a harmony they produce! Surely only the author and creator of worlds could create and paint a scene like this. And when one surveys all this extravagance of natural beauty and the mind comprehends the magnitude of nature's own handiwork, how insignificant is man in his resources! Amid the ever shifting views that spread out before the tourist as he gazes down the cañon while standing over the brink of the falls, or looks down from Inspiration Point, three or four miles away, into the terrible gorge, which his eye can follow for eight or ten miles, his bump of inspiration, if he has one, will swell, with adoration, if such is possible, and with reverence, as perhaps never before, he feels that Nature is truly a revelation of God.

"To him who in the love of Nature holds
Communion with her visible forms she speaks
A various language."

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NO. XII.

[From the Amherst Record, Feb. 13, 1889.]

On Tuesday morning, Sept. 4th, the herd of "trail horses" was brought to the hotel at an early hour, and the party, one by one, mounted their saddles and fell into line. Some were army cavalry officers and quite a number had "been there before;" but few if any, had had any experience in riding in the mountains and some were placed in the saddle for the first time. However, it mattered not whether one could ride horse or could not ride horse; the horse and saddle and bridle were all that were necessary. The young and the aged, the experienced and the in-

experienced were all the same to the horses and the wee little mule. All that was required of the riders was to cling to the saddle, guide the animal by pressing the reins on his neck instead of pulling on the bit, and using the birch when necessary; but this was quite sufficient for some in the party. These animals, like the "peak horses" at Manitou, Colo., are sure of foot. This is their crowning virtue; they are strong and sure, if not fleet. Evidently the Psalmist had never drawn a rein over an animal like one of these, when he wrote "an horse is a vain thing for safety; neither shall he deliver any by his great strength." They are walking examples of moderation and self-control, to be sure, but as such, they can teach many specimens of the human family lessons which the latter would do well to heed. "Slow and sure," seems to have been bred into their every fiber, and while an earthquake might not disturb their metal, they manage to "get there," every time. They creep down the hill sides, which seem almost perpendicular, and up the steep rocky cliffs, stepping over rocks and fallen trees that make the way appear impassible. They stop and meditate, will walk on narrow ridges, and go far out of their way to rub their passengers against the trees on either side of the trail. The crooked way leads along the very brink of the cañon for miles. In some places we can drive out on the narrow ledges that overhang the great chasm as if suspended upon brackets of basalt rocks. Here we gaze into the momentous depths as though we stood on a lofty pinnacle, and in reality such is the case. In other places, the trail follows the contour of the cañon, winding in and out on the verge of the precipice. To the timid, the way at first seems hazardous; but the trained horses return with their living packs in better spirits than when they set out on the journey. Three miles below the Great Fall is Inspiration Point, the extent of our ramble. This is one of those rocks jutting into the cañon and extends out so

far that many people do not attempt to walk out to the farthest point, but content themselves by taking in the fine views from the edge. Let the reader conceive of a ravine twenty miles long, the cliffs at many points from 1200 to 2000 feet in perpendicular height, sloping like the letter V, with a ribbon of dark green water running down and occupying the full width of the bottom. At the top, the walls may be half a mile wide in places, but they do not look so far apart. Climbing out on the point, one can drop a stone to a vertical depth of nearly fifteen hundred feet. A gentleman set a stone rolling down the cliff and by the watch it was 55 seconds by actual time before it found its resting place in the bottom of the cañon. From this rock one can look three and a half miles up and see the great cataract, and eight miles down the cañon, making about a dozen miles that the eye sweeps at an unobstructed glance, or over twenty miles of the towering wall, the area of which doubtless exceeds half a million square yards. The variety of rich colors and the matchless shades, are its crowning beauty. Like the spires of a vast cathedral, the bold shafts of rock, carved by the action of the powerful elements, stand out singly and alone. On these weather beaten summits, we see the nests of eagles and hawks, while the birds of prey are majestically circling through the blue air in the depths of the cañon.

After spending an hour in viewing the finest scenery, perhaps, on this continent, we again mount the trail horses and are conveyed back to the hotel in season to do ample justice to Landlord Bloomburg's generous bill of fare.

Since writing the above, I have read the description from the pen of Rev. Dr. Wayland Hoyt which is considered one of the best and most graphic that have appeared, and I wish to quote his language, as follows:—"How shall I in any wise describe this tremendous sight,—its overpowering grandeur, and, at the same time, its inexpressible beauty?

"Look yonder—those are the Lower Falls of the Yellowstone. They are not the grandest in the world; but there are none more beautiful. There is not the breadth and dash of Niagara, nor is there the enormous depth of leap of some of the waterfalls of the Yosemite. But here is majesty of its own kind, and beauty too. On either side are vast pinnacles of sculptured rock. There, where the rock opens for the river, its waters are compressed from a width of 200 feet between the Upper and Lower Falls to 100 feet where it takes the plunge. The shelf of rock over which it leaps is absolutely level. The water seems to wait a moment on its verge; then it passes with a single bound of 300 feet into the gorge below. It is a sheer, unbroken, compact, shining mass of silver foam. But your eyes are all the time distracted from the fall itself, great and beautiful as it is, to its marvelous setting,—to the surprising, overpowering cañon into which the river leaps, and through which it flows, dwindling to but a foamy ribbon there in its appalling depths. As you cling here to this jutting rock the falls are already many hundred feet below you. The falls unroll their whiteness down amid the cañon glooms. * * * These rocky sides are almost perpendicular: indeed, in many places the boiling springs have gouged them out so as to leave overhanging cliffs and tables at the top. Take a stone and throw it over,—you must wait long before you hear it strike. Nothing more awful have I ever seen than the yawning of that chasm. And the stillness, solemn as midnight, profound as death! The water dashing there, as in a kind of agony, against those rocks, you can not hear. The mighty distance lays the finger of silence on its white lips. You are oppressed with a sense of danger. It is as though the vastness would soon force you from the rock to which you cling. The silence, the sheer depth, the gloom, burden you. It is a relief to feel the firm earth beneath your feet again, as you carefully crawl back from your perching place.

But this is not all, nor is the half yet told. As soon as you can stand it, go out on that jutting rock again and mark the sculpturing of God upon those vast and solemn walls. By dash of wind and wave, by forces of the frost, by file of snow plunge and glacier and mountain torrent, by the hot breath of boiling springs, those walls have been cut into the most various and surprising shapes. I have seen the middle age castles along the Rhine: there those castles are reproduced exactly. I have seen the soaring summits of the

great cathedral spires in the country beyond the sea: there they stand in prototype, only loftier and sublimer.

"And then, of course, and almost beyond all else, you are fascinated by the magnificence and utter opulence of color. Those are not simply gray and hoary depths and reaches and domes and pinnacles of sullen rock. The whole gorge flames. It is as though rainbows had fallen out of the sky and hung themselves there like glorious banners. The underlying color is the clearest yellow; this flushes onward into orange. Down at the base the deepest mosses unroll their draperies of the most vivid green; browns, sweet and soft, do their blending; white rocks stand spectral; turrets of rock shoot up as crimson as though they were drenched through with blood. It is a wilderness of color. It is impossible that even the pencil of an artist can tell it. What you would call, accustomed to the softer tints of nature, a great exaggeration, would be the utmost tameness compared with the reality. It is as though the most glorious sunset you ever saw had been caught and held upon that resplendent, awful gorge.

"Through nearly all the hours of that afternoon until the sunset shadows came, and afterward, amid the moonbeams, I waited there, clinging to that rock, jutting out into that overpowering, gorgeous chasm. I was appalled and fascinated, afraid and yet compelled to cling there. It was an epoch in my life."

On Wednesday morning, the coaches drive up to the door of the hotel, and we take passage on our return trip to Mammoth Hot Springs. The morning is quite cool, and suggestive of a snow storm. We enter a road cut through the heavily timbered forests, straight as an arrow for miles, and hard as adamant. The horses keep up a lively pace, and the passengers inside the stages, free from dust, are more comfortable than those on the outside. We reach Norris Basin at noon, and here are given a good dinner. The horses having rested, we proceed on our journey. During the day the sun scarcely shines out clear once, and late in the afternoon, a threatened thunder storm to the northwest is watched for some time with more or less anxiety. We near the Golden Gate, and pass down

the Gardner valley at a rapid rate. This is our last ride in the coaches through the Park. The skies grow blacker and the thunder head in the tempest approaches nearer and nearer, and before we reach our destination, we expect to be deluged with rain if not pelted with hail. We glide down the mountain at the rate of more than ten miles an hour, while every moment is precious. Suddenly as we come around a turn in the road and down a steep decline, we see the soldiers barracks, Terrace mountain, Liberty Cap, and in less time than it takes to write it, we find ourselves in front of the big hotel piazza. We had intended to be photographed in order to exhibit and prove to our friends the depth of dirt that will collect in a three hours ride; but the threatening clouds bade us postpone this part of the program. The hotel is swarming with strangers; eighty-two Dakota editors and newspaper men and representatives, including ladies, are here to begin the grand tour on the morrow. It is the Dakota Press association, accompanied by Brookings' cornet band of over twenty pieces. Augustus Davis is president of the association, and editor Adams of Webster, Dak., Vice president. In the evening, the large dining hall is cleared and the band gives a concert, which is followed by a grand ball. In the farther end of the hotel is a sort of reading room, used also for lectures. The lecturer was F. Jay Haynes, the National Park photographer, whose home and main studio is at Fargo, D. T. James Paris was the optician, who illustrated the lecture by stereoptican slides. Most of the Raymond party attend the lecture, and before their eyes, had the marvels which they had for days been viewing, reproduced on canvas. They were quite familiar and better appreciated than on our outward trip when we listened to the same lecture and saw the same views. We had our attention called first of all to the interior of the photographer's car, which at certain seasons of the year is run on the Northern

Pacific railroad (the only enterprise of the kind in the union) from Lake Superior to the Pacific coast. Then we were introduced to the snowy mountains, 11,000 feet high; emigrant mount, the highest altitude where agriculture to any extent thrives; Yankee Jim's cañon, which was the main entrance to the Park before the railroad was built, 18 miles from Mammoth Hot Springs; Cinnaba mountain on which is the Devil's slide; a map of the Park, 55 by 65 miles; Yellowstone Lake at an altitude of 8000 feet, the largest lake of this altitude in the world; Cartney's pioneer cabin, before which two men were found dead in 1877, during the Nez Perce Indian war; Liberty Cap, 52 feet high; summit of Jupiter Terrace; Golden Gate; Obsidian mountain; a number of geysers, including the Minute Man; Gibbon falls, between Norris and Lower Geyser Basins; paint-pots; Fountain geyser, Excelsior and Prismatic Lake on Hell's Half acre; Biscuit basin, surrounded on its banks by black pearl: The Fan geyser, Riverside, Giant, the Splendid with William Cullen Bryant's profile, the Castle and Castle Well, Specimen Lake, Old Faithful, the Chinaman, and other geysers. He also exhibited a Petrified Indian and a petrified bird singing a petrified song; the natural bridge 150 feet above the water, the Upper and Lower falls of the Yellowstone, and other attractions, all of which were full of interest to those who had made the grand tour. Mr. Haynes' lecture is profitable in two ways; it gives the stranger some idea of what he may expect to see when he goes through the Park, and clinches the memory of those who have viewed the objects with the natural eye.

Some members of the party enter the ball room and enjoy tripping the light fantastic toe to the giddy music of the band. Among the dancers is here and there a soldier exhibiting his fine form and his finer clothes, while the first *down* has scarcely begun to shade his youthful face. On looking upon the dazzling scene of gay national colors and graceful

but slender forms, gliding over the waxened floor, guiding their frail or stout partners, as the case happens to be, one cannot help soliloquizing to himself on the great moral effects of war and its attaches. The pretty and lively Miss Wakefield, daughter of the veteran stage proprietor is on the floor, and her graceful movements attract the attention and elicit the admiration of all, especially of some of the young gentlemen dancers

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NO. XIII.

[From the Amherst Record, Feb. 27, 1889.]

In these letters I have alluded to the trapping expedition of Lewis and Clarke, made in the very beginning of this century which resulted in breaking the first intelligence of this brimstone region. On their return trip of these explorers, one of their men, named Colter, took his discharge and went back into the mountains on the following year in company with one, Potts, another member of the party. On this journey they were captured by a squad of Blackfeet Indians, as they were going to examine their beaver traps. Potts was immediately killed and Colter taken prisoner. To show what he endured, I wish to quote from a paper prepared by W. F. Sanders in Vol. I. of "Contributions to the Historical Society of Montana." "They now seized Colter, stripped him entirely naked, and began to consult on the manner in which he should be put to death. They were first inclined to set him up as a mark to shoot at; but the chief interfered, and, seizing him by the shoulders, asked him if he could run fast. Colter, who had been some time among the Kee Katsa or Crow Indians, had, to a considerable degree, acquired the Blackfeet language, and was also well acquainted with Indian customs. He knew that he had now to run for his life, with the terrible odds of five or six hundred armed Indians against him. He therefore cunningly replied that he was a very bad runner, although, in truth, he was considered by the hunters as remarkably swift. The chief commanded the party to remain stationary, and led Colter out on the prairie three or four hundred yards, and released him—to save himself if he could.

At that instant the war-whoop sounded in the ears of poor Colter, who, urged with the hope of preserving life, ran with a speed at which he himself was surprised. He proceeded toward Jefferson's Fork, having to traverse a plain six miles in breadth, abounding with the prickly pear, on which he every instant was treading with his naked feet. He ran nearly half-way across the plain, before he ventured to look over his shoulder, when he perceived that the Indians were very much scattered, and that he had gained ground to a considerable distance from the main body; one Indian, however, who carried a spear, was much ahead of the others, and not more than a hundred yards from him. A faint gleam of hope suddenly cheered the heart of Colter, who derived confidence from the belief that escape was within the bounds of possibility. But that confidence was nearly fatal to him; for he exerted himself to such a degree that the blood gushed from his nostrils and soon almost covered the fore part of his body. He had arrived within a mile of the river, when he distinctly heard the sound of footsteps behind, and every instant expected to feel the spear of his pursuer. He again turned his head and saw the savage not twenty yards from him.

Determined, if possible, to avoid the expected blow, he stopped, turned around, and spread out his arms. The Indian surprised at the movement and perhaps at the bloody appearance of Colter, also attempted to stop; but, exhausted with running, he fell while throwing his spear, which stuck in the ground and broke in his hand. Colter instantly snatched up the pointed part, with which he pinned him to the earth, and then continued his flight. The foremost of the pursuing Indians, on arriving at the place, stopped until others came up, and then gave a hideous yell. These moments were improvised by Colter, who, although fainting and exhausted, succeeded in gaining the skirt of cottonwood trees on the borders of the fork, to which he ran, and plunged into the river. Fortunately for him, a little below this place was an Island, against the upper point of which a raft of drift timber had lodged. He dived under the raft, and, after several efforts, came to the surface of the water, among the trunks of trees covered with smaller wood to the depth of several feet. Scarcely had he secured himself, when the Indians reached the river, screeching and yelling, as Colter expressed it, "like so many devils." They were several times on the raft during the day, and were seen through the

chinks by Colter, who was congratulating himself on his escape, until the idea arose that they might set the raft on fire. In horrible suspense, he remained until night, when, hearing no more from the Indians, he dived from under the raft, and swam instantly down the river to a considerable distance, then landed and tramped all night. Although happy in having escaped from the Indians, he was completely naked, under a burning sun; the soles of his feet were filled with the thorns of the prickly pear; he was hungry and had no means of killing game, although he saw abundance around him, and was at a great distance from the nearest settlement. Almost any man but an American hunter would have despaired under such circumstances, but the fortitude of Colter remained unshaken. After seven days of sore travel, during which he had no other sustenance than the root known by naturalists under the name of "psoralea esculenta," he arrived in safety at Lisa's Fort, on the Bighorn branch of the Yellowstone River.

Among the many stories related about this region, one is to the effect that here were large fields of petrified sage, animals, tracks and diamonds. In one of his reports, Dr. Hayden says "There are fields of sage as well as bits of forests, which, lying in the immediate vicinity of springs, have been petrified while standing. The hot, silicious water is drawn up through the pores of the wood, and between the wood and the bark, by capillary attraction, and, depositing silica wherever it goes, transforms the trees or brush into rock." It is reported that rabbits and sage hens are found in perfect condition and as natural as when living, and "more wonderful yet, the petrified bushes bear the most wonderful fruit,—diamonds, rubies and emeralds as large as walnuts." On the train and at various places where relics are kept for sale all sorts of petrified woods, are offered and metals dispensed for small sums for souvenirs of the Yellowstone Park. Some of the diamonds, which the Rocky mountaineer boasts in wearing, are as large as walnuts. There are also very beautiful crystals formed on the trees near some of the geysers.

One word more about the hotels in the Park before bidding good bye to the landlords and landladies. It will probably be conjectured from what I have said that they do not have Florida weather during the winter season in these mountains; but here winter means something. It means the cessation of most all business, about ten to fifteen feet of snow on the level and fifty to one hundred in places, mercury from 20 to 65 degrees below zero, and a deserted arctic wilderness of polar ice and snow. No activity anywhere, except the old spouters which are more active and perform bigger feats than when they are the admiration of the hundreds of visitors who come here from July to October. At times every shrub is festooned with beautiful frost work and the whole Park is a scene of beauty that beggars description. During these severe winter months hundreds of elk herd in the ravines and sheltered places, and become so tame that a hunter heartless enough can walk among them and club them to death. As Photographer Haynes in his lecture said, it does not require much of a hunter to capture these harmless animals in the winter time and certainly, there could not be much glory or satisfaction in the act. But the hotels; how is all this property protected nine months in the year? It is not wholly deserted; for at Norris Basin, at the Firehole, at the Upper Basin and at the Grand Cañon,—at each of these places a man stays through all weathers and spends his time in shoveling the snow off the roofs, and keeping from freezing to death. He is proprietor, landlord and general superintendent of all he surveys. He receipts for the property in the fall when he takes possession and is held responsible for everything till spring when he gives up the keys. The furniture and everything is left in the hotel as it is at the close of the business year in the fall. Last winter at Grand Cañon, the snow was as high as the hotel, and

a man on snow shoes could walk over the building. This gives some idea of the depth of snow. The keeper occasionally puts on his snow shoes and goes up to the Springs in a day. By the way, these shoes are different from any seen in Amherst or Canada. They are twelvefeet long and fourinches wide turning slightly up at the front end. A good walker can shuffle from fifty to seventy-five miles a day on a pair of them, and he will gladly do this in order to see a companion that is not a geyser or a bear. It would be a good reminder to those chronic growlers who have all that heart can wish to hear some of these mountaineers describe their exultant joy upon meeting their friends after months of separation and not seeing a human being for weeks at a time among frigid, dreary mountains, surrounded by volcanoes and wild beasts, and more terrible still, shut up with their own thoughts. If some of the grumblers who are always complaining of their lot, could be banished for a winter to this high altitude, perhaps they would thereafter better enjoy the common blessings of life among friends in civilization. It would not be the hardships of exile life in the Siberian mines of Kara as the air here is pure and bracing; but to remain a hundred miles from civilization and see no human friend or foe for weeks, and dwell in memory of all the past, would be exile enough for almost any one, even if books are companionable, and the presence of bears and other wild animals do not make one afraid.

During the past season, Walter H. Weed of the U. S. Geological survey, visited this locality and discovered a "Death Gulch," in the extreme north-eastern portion of the Park, a short distance south of the mail route between the Springs and the mining camp of Cooke city. It is described as a V-shaped trench in the mountain, not over 75 feet deep. Here are poisonous emanations that have caused the death of several bears and other and smaller animals. Since

making my journal, an interesting article has appeared in a recent number of *Science* written by Mr. Weed, describing his discovery. He says:—

"The gulch ends, or rather begins, in a 'Scoop' or basin about two hundred and fifty feet above Cache Creek; and just below this we found the fresh body of a large bear, a silver-tip grisly, with the remains of a companion in an advanced state of decomposition above him. Near by were the skeletons of four more bears with the bones of an elk a yard or two above; while at the bottom of the pocket were the fresh remains of several squirrels, rock hares and other small animals, besides numerous dead butterflies and insects. The body of the grisly was carefully examined for bullet-holes or other marks of injury, but showed no traces of violence, the only indication being a few drops of blood under the nose. It was evident that he had met his death but a short time before, as the carcass was still perfectly fresh, though offensive enough at the time of a later visit. The remains of a cinnamon bear just above and alongside of this were in an advanced state of decomposition, while the other skeletons were almost denuded of flesh, though the claws and much of the hair remained. It was apparent that these animals, as well as the squirrels and insects, had not met their death by violence but had been asphyxiated by the irrepressible gas given off in the gulch. The hollows were tested for carbonic acid gas with lighted tapers without proving its presence; but the strong smell of sulphur, and a choking sensation of the lungs, indicated the presence of noxious gases, while the strong wind prevailing at the time, together with the open nature of the ravine, must have caused a rapid diffusion of the vapors."

In connection with these Notes, I wish to mention three or four of our great American railway systems which have aided very materially in building up the great West.

THE CHICAGO, BURLINGTON AND QUINCY SYSTEM

has gained some notoriety through the "Q" strike; but the road and its branches are managed by practical officers, men well schooled in all that pertains to railroading. They are gentlemanly toward the public and have treated

the public in such a manner that what business was driven away will gradually drift back into their management again. The road could do nothing but stand up for their rules and regulations whether the great army of employes were entirely satisfied or not. Had they yielded to the demands of an unjust organization, the road would have been bankrupt before now. The men were well off, and after months of sober and earnest deliberation, most of them came to that conclusion. It was right for them to stop work, if for any reason they were dissatisfied; but it was a long and dangerous step for them to take when with bombs and dynamite, they undertook to force the corporation to stop all traffic or yield to their demands. The obstinacy of the company in refusing to recognize the strikers was a blow to trades unions, which could be dealt in no other way, and by the results thus obtained, every railroad company and possibly other organizations, are favorably affected. It is safer to trust the interests of the public in the hands of railroad corporations than in the hands of domineering, unprincipled demagogues, who wish to usurp authority and are satisfied with nothing less than their own demands, while they assume to command a great army of laboring men from whom they extort money in the form of fees and taxes for the purpose of carrying out their designs. The year with the "Q" folks, has been unprecedented, but it is still a mighty organization, doing a tremendous business and increasing it every day. At St. Paul we left the Raymond party and came down into Iowa on the Chicago, Milwaukee and St. Paul railway to Ottumwa and thence on the C. B. & Q. road into Clarke county. To see the immense trains of stock headed towards Chicago, one following behind another, is indeed a sight not witnessed in the East, and the thought instinctively comes into the mind, "Where do all these cattle and hogs go to?" But one can answer the question satisfactory by visiting the stock

yards in Chicago and Kansas city, where the great inquiry will be, "Where did all these animals come from?" The Chicago, Burlington & Quincy, now extend from Chicago to Denver, and north and south, traversing a country that is as fertile as any the sun shines upon.

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY SYSTEM.

The C. M. & St. P. Ry. system is one of steady growth. The genesis of the system was the Milwaukee & Waukesha railroad, chartered in 1847. To this was added many other roads, including the La Crosse & Milwaukee, the Milwaukee & Fond du Lac, the Milwaukee & Watertown, Watertown & Madison, Milwaukee & Horicon, Ripon & Wolf River road, Madison & Prairie du Chien road, Western Union road, Iowa & Dakota, Hastings & Dakota, Chicago, Clinton, Dubuque & Minnesota and its branches, Wisconsin Valley, and a number of other roads. These changes have been going on since 1852, and the system has extended itself farther and farther until the country west and northwest of Chicago is one great network of railroads, operated under one board of managers. On Jan. 1, 1888 the system controlled 5,646 miles, divided as follows: Illinois 317, Wisconsin 1,287, Iowa 1,566, Minnesota 1,122, Dakota 1,213 and Missouri 142. As has been said, the C. M. & St. P. Ry. may be termed a conglomerate, being a union of several constituencies held together by legislative cement. In the ten years between 1875 and 1885, the company built or purchased 3,506 miles of road. The preferred stock of the C. M. & St. P. commands a good price. The road runs five vestibule cars, and is doing a great commercial business.

THE NORTHERN PACIFIC RAILROAD, has a checkered history, much like other great thoroughfares in the United States. The road's chart r dates back to 1864, but the enterprise was first agitated much earlier. About 1845 a wealthy and enterprising merchant, Asa Whitney of New York, asked Congress to grant him his

plan of building a railroad from the head of Lake Michigan, or from Prairie du Chien on the Mississippi river to the mouth of Columbia river in Oregon. He asked for a land grant of 60 miles in width along the proposed route, and at one session, the bill was within one vote of passing the Senate. The Mexican war was followed by the annexation of California and gold discoveries, and then the prominent point to reach was the Bay of San Francisco. This resulted in granting the charter for the Union and Central Pacific roads in 1862, with a grant of public lands. J. Gregory Smith of the Vermont Central road was the first president of the Northern Pacific. The original charter did not allow the issue of bonds. Jay Cooke & Co. of Philadelphia negotiated to sell the bonds after the company secured the privilege, and in two years this firm disposed of over \$30,000,000 in N. P. bonds, bearing 7 3-10 per cent interest. With the money thus obtained work began in the spring of 1870, and in 1873 the road was built to Bismarck. In 1873 the well known banking house failed and work stopped on the railroad. President Smith was succeeded by General Cass, and he by Charles B. Wright of Philadelphia. In 1879, Frederick Billings succeeded Wright in the presidency and the construction of the road continued till 1881. The last rail on the Northern Pacific was laid Sept. 23, 1883, at a point in the valley of the Hellgate river, near the mouth of Gold creek. On this occasion four trains of invited guests from the East, met another from the Pacific coast. Hon. W. M. Evarts delivered an oration and President Henry Villard drove the last spike. At this gathering were many distinguished guests from the English and German parliaments, the British and American ambassadors at Washington, and members of the American Congress, besides ex-presidents of the road, the governors of the states through which it is built, Gen. U. S. Grant, and a number of prominent scientists and engineers and representa-

tives of the American press. I take these facts from an edition of the road's guide book for 1888. The road and its numerous lines traverses seven large states and territories estimated to embrace a sixth of the area of the United States. The entire length of the road and its branches is over 2,000 miles. The states and territories thus traversed are Wisconsin, Minnesota, Dakota, Montana, Idaho, Washington and Oregon.

Another great railroad system is known as the

MANITOBA SYSTEM.

This comprises in all about 3000 miles of track. The construction of the road from Minot, 530 miles from St. Paul, Minn., was effected in 1886. The extension of the track from Minot to Great Falls, a distance of 500 miles was accomplished in 1887; also the Manitoba Central of 98 miles from Great Falls to Helena. St. Paul, Minneapolis and Duluth were the primary bases of operations; Minot was the secondary base and there was accumulated in 1887 probably the largest quantity of construction material ever massed at any one point. It covered forty acres of ground and comprised vast piles of steel rails, ties, timber, piling and spikes and iron by the thousands and millions of tons.

Said Charles Dudley Warner, Montana has condensed the ordinary achievements of a century into twenty years, and loyalty to its present and expectation of its future are as strong in its citizens as is the attachment of men of Massachusetts to the state of nearly three centuries of growth.

"Manitoba system gridirons North Minnesota, runs to Duluth, puts two tracks down the Red River valley (one on each side of the river) to the Canada line, sends out various spurs into Dakota, and operates a main line from Grand Forks westward through the whole of Dakota, and through Montana as far as the Great Falls of the Missouri, and thence to the canyon of the Missouri and the canyon of the Prickly Pear to Helena—in all about 3,000 miles of track. Its president is Mr. James J. Hill,

a Canadian by birth, whose rapid career from that of a clerk on the St. Paul levee to his present position of influence, opportunity and wealth, is a romance in itself, and whose character, integrity, tastes and accomplishments, and domestic life, were it proper to speak of them, would satisfactorily answer many of the questions that are asked about the materialistic West."

The average force on the grading was 3,300 teams and about 8,000 men. Upon track-laying, surfacing, piling and timber work there were 225 teams and about 650 men. The heaviest work was encountered on the eastern end, so that the track was close upon the grading up to the 10th of June. Some of the cuttings and embankments were heavy. After the 10th of June progress upon the grading was very rapid. From the mouth of Milk river to Great Falls (a distance of 200 miles) grading was done at an average rate of seven miles a day. Those who saw this army of men and teams stretching over the prairie and casting up this continental highway, think they beheld one of the most striking achievements of civilization.

I may mention that the track is all cast up (even where the grading is easy) to such a height as to relieve it of drifting snow; and to give some idea of the character of the work, it is noted that in preparing it there were moved 9,700,000 cubic yards of earth, 15,000 cubic yards of loose rock, and 17,500 cubic yards of solid rock, and that there were hauled ahead of the track and put in the work to such distance as would not obstruct the track laying (in some instances thirty miles), 9,000,000 feet (board measure) of timber and 390,000 lineal feet of piling.

On July 16, 7 miles and 1,040 feet of track were laid, and on Aug. 8, 8 miles and 60 feet were laid, in each instance by daylight, and by the regular gang of tracklayers, without any increase of their numbers whatever. The entire work was done by handling the iron on low iron cars, and depositing it on the track from the car at the front end.

It is believed that the work of grading 500 miles of railing in five months, and the transportation into the country of everything consumed, grass and water excepted, and of every rail, tie, bit of timber, pile, tool, machine, man or team employed, and laying 633 miles of track in seven and a half months, from one end, far exceeds in magnitude and rapidity of execution any similar undertaking in this or any other country.

The company has built this road without land grant or subsidy of any kind. The Montana extension, from Minot, Dak., to Great Falls, runs mostly through Indian and military reservations, permission to pass through being given by special act of congress, and the company buying 200 feet roadway. Little of it, therefore, is open to settlement.

These reservations, naming them in order westward, are as follows: The Fort Berthold, boundary of which is twenty-seven miles west of Minot, has an area of 4,550 square miles (about as large as Connecticut) or 2,912,000 acres. The Fort Buford military reservation, lying in Dakota and Montana, has an area of 900 square miles, or 576,000 acres. The Blackfeet Indian reserve has an area of 34,000 square miles (the state of New York has 46,000), or 21,760,000 acres. The Fort Assinaboin military reserve has an area of 86,982 square miles, or 556,684 acres.

It would be gratifying, certainly to myself, to expand my notes upon the "Twin Cities" of the Northwest, Minneapolis and Saint Paul; the great bonanza wheat farms of Dakota, and "Bad-Lands" farther to the west; Crow Indian reservation, and the rich valley of the Yellowstone through which the Northern Pacific railroad extends for hundreds of miles with now and then a "shack" and here and there a settlement. But I must draw these letters to a close, and in doing so, permit me to urge all who peruse them to make a journal by the way and *en route* whenever they shall enjoy the same opportunity for a vacation—

a change of scene and for recreation—to raphy, and above all things study the hab-
visit some of the wonders of America; and its and condition of the people in the differ-
I would also say to all who seek rest and ent sections of our great and prosperous
enjoyment in travel, visit your own coun- nation.
try first, and become familiar with its geog-



